

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT5440117

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	RELEASE OF SECURITY INTERESTS

CONVEYING PARTY DATA

Name	Execution Date
WELLS FARGO BANK, NATIONAL ASSOCIATION	03/25/2019

RECEIVING PARTY DATA

Name:	THE MANITOWOC COMPANY, INC.
Street Address:	ONE PARK PLAZA
Internal Address:	11270 WEST PARK PLACE, SUITE 1000
City:	MILWAUKEE
State/Country:	WISCONSIN
Postal Code:	53224
Name:	MANITOWOC CRANES, LLC
Street Address:	ONE PARK PLAZA
Internal Address:	11270 WEST PARK PLACE, SUITE 1000
City:	MILWAUKEE
State/Country:	WISCONSIN
Postal Code:	53224
Name:	GROVE U.S. L.L.C.
Street Address:	1565 BUCHANAN TRAIL EAST
City:	SHADY GROVE
State/Country:	PENNSYLVANIA
Postal Code:	17256
Name:	MANITOWOC CRANE COMPANIES, LLC
Street Address:	ONE PARK PLAZA
Internal Address:	11270 WEST PARK PLACE, SUITE 1000
City:	MILWAUKEE
State/Country:	WISCONSIN
Postal Code:	53224

PROPERTY NUMBERS Total: 100

Property Type	Number
Application Number:	29438308
Application Number:	11733104

PATENT

Property Type	Number
Application Number:	12023902
Application Number:	13752053
Application Number:	13963993
Application Number:	14665886
Application Number:	13165287
Application Number:	13712774
Application Number:	13712766
Application Number:	12847902
Application Number:	11703683
Application Number:	12561007
Application Number:	12561103
Application Number:	10313266
Application Number:	14109099
Application Number:	12781339
Application Number:	13154236
Application Number:	13912884
Application Number:	12273310
Application Number:	13846498
Application Number:	09233927
Application Number:	11730371
Application Number:	12718156
Application Number:	08792681
Application Number:	12777094
Application Number:	12709678
Application Number:	13043019
Application Number:	14399766
Application Number:	12764734
Application Number:	10068563
Application Number:	09753912
Application Number:	12368143
Application Number:	12561094
Application Number:	12844643
Application Number:	12730421
Application Number:	09277364
Application Number:	08834724
Application Number:	08842974
Application Number:	09175065
Application Number:	12559253

Property Type	Number
Application Number:	14158226
PCT Number:	US2015012936
Application Number:	14605806
Application Number:	08748986
Application Number:	12219112
Application Number:	11740726
Application Number:	08834673
Application Number:	13348467
Application Number:	12268868
Application Number:	08950870
Application Number:	08916738
Application Number:	13828127
Application Number:	13841082
Application Number:	13236307
Application Number:	12762186
Application Number:	14590608
Application Number:	09259223
Application Number:	62118183
Application Number:	12710960
Application Number:	08826627
Application Number:	13100758
Application Number:	12417256
Application Number:	13239006
Application Number:	15006864
Application Number:	12368125
Application Number:	12368113
Application Number:	08774200
Application Number:	12073416
Application Number:	12561058
Application Number:	62140852
Application Number:	62174899
Application Number:	62141150
Application Number:	62199167
Application Number:	62175023
Application Number:	62141013
Application Number:	14606891
PCT Number:	US2015013098
PCT Number:	US2015013039

Property Type	Number
Application Number:	14965462
Application Number:	14974812
Application Number:	10370714
Application Number:	09205295
Application Number:	09084419
Application Number:	09661293
Application Number:	09205291
Application Number:	08919448
Application Number:	09666599
Application Number:	09055299
Application Number:	09055239
Application Number:	10082217
Application Number:	09212597
Application Number:	09205298
Application Number:	09182464
Patent Number:	5823279
Application Number:	14207052
Patent Number:	5522515
Patent Number:	5579931
Patent Number:	5615784
Patent Number:	5649635
Patent Number:	7508643

CORRESPONDENCE DATA

Fax Number: (800)914-4240
Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone: 800-713-0755
Email: Michael.Violet@wolterskluwer.com
Correspondent Name: CT CORPORATION
Address Line 1: 4400 EASTON COMMONS WAY
Address Line 2: SUITE 125
Address Line 4: COLUMBUS, OHIO 43219

NAME OF SUBMITTER:	DORIS KA
SIGNATURE:	/Doris Ka/
DATE SIGNED:	03/26/2019

Total Attachments: 60
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RELEASE OF SECURITY INTEREST IN PATENTS

This RELEASE OF SECURITY INTEREST IN PATENTS (this “Release”), dated as of March 25, 2019 (the “Effective Date”), is made by Wells Fargo Bank, National Association, a national banking association, in its capacity as Notes Collateral Agent (the “Agent”), in favor of the grantor parties identified on the signature page hereto (collectively, the “Grantors” and each individually a “Grantor”).

WHEREAS, pursuant to that certain Security Agreement, dated as of March 3, 2016, by and among the Agent, the Grantors and certain other parties thereto (including all annexes, exhibits or schedules thereto, as amended, restated, supplemented or otherwise modified from time to time, the “Security Agreement”), the Grantors granted, assigned and pledged to the Agent, in its capacity as Notes Collateral Agent, a continuing security interest in and to certain collateral;

WHEREAS, pursuant to the Security Agreement, the Grantors executed and delivered a Patent Security Agreement, dated as of March 3, 2016 (the “Patent Security Agreement”), for recordal with the United States Patent and Trademark Office, pursuant to which the Grantors granted, assigned and pledged to the Agent, in its capacity as Notes Collateral Agent, a continuing security interest in and to the Patent Collateral, including the patents and patent applications set forth in Schedule I attached hereto;

WHEREAS, the Patent Security Agreement was recorded with the United States Patent and Trademark Office on April 7, 2016 at Reel/Frame 038382/0729, Reel/Frame 038383/0094, Reel/Frame 038382/0911 and Reel/Frame 038382/0818;

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Agent hereby agrees as follows:

1. Defined Terms. All capitalized terms used, but not otherwise defined herein, shall have the respective meanings ascribed in or otherwise referenced in the Security Agreement or the Patent Security Agreement, as applicable.
2. Release of Specified Collateral. The Agent, without representation or warranty of any kind, hereby releases, discharges, terminates and cancels all of its security interest in and to the Patent Collateral, including the patents and patent applications set forth in Schedule I attached hereto (the “Released Patent Collateral”), arising under the Security Agreement and the Patent Security Agreement. If and to the extent that the Agent has acquired any right, title or interest in and to any Released Patent Collateral under the Patent Security Agreement, the Agent, without representation or warranty of any kind, hereby re-transfers, re-conveys and re-assigns such right, title or interest to the applicable Grantor.
3. Further Assurances. The Agent agrees to take all further actions, and provide to the Grantors and their successors, assigns or other legal representatives, all such cooperation and assistance (including, without limitation, the execution and delivery of any and all documents or other instruments), reasonably requested by any Grantor, at such Grantor’s sole cost and expense, to more fully and effectively effectuate the purposes of this Release.
4. Recordation. The Agent hereby authorizes each Grantor, or such Grantor’s authorized representative, to record this Release with the United States Patent and Trademark Office.
5. Governing Law. This Release shall be subject to the provisions regarding choice of law and venue and jury trial waiver set forth in Section 26 of the Security Agreement, and such provisions are incorporated herein by this reference, mutatis mutandis.

IN WITNESS WHEREOF, the Agent has caused this Release to be executed by its duly authorized representative as of the Effective Date:

**WELLS FARGO BANK, NATIONAL
ASSOCIATION**, acting in its capacity as
collateral agent for the Secured Parties

By:


Name: *David S. Probst*
Title: *Assistant Vice President*

GRANTORS:

**THE MANITOWOC COMPANY, INC.
MANITOWOC CRANE COMPANIES, LLC
GROVE U.S. L.L.C.
MANITOWOC CRANES, LLC**

[MTW – Signature Page to Release of Security Interest in Patents]

**PATENT
REEL: 048698 FRAME: 0528**

SCHEDULE I

Patents

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
United States	Issued	WORLD GLOBE WITH HUMAN FIGURES AND AWARD	29/438,308	11/28/2012	D,738,780	9/15/2015	The Manitowoc Company, Inc.
Austria	Issued	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	08251277.3	4/1/2008	1990306	11/6/2013	Manitowoc Cranes, LLC
Austria	Issued	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	13153486.9	1/31/2013	2589565	9/10/2014	Manitowoc Cranes, LLC
Austria	Filed	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	14183968.8	4/1/2008			Manitowoc Cranes, LLC
China P.R.	Filed	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	201210253579.3	10/26/2007			Manitowoc Cranes, LLC
China P.R.	Filed	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	201010624732.X	12/29/2010			Manitowoc Cranes, LLC
European Patent Convention	Filed	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	13153415.8	10/15/2007			Manitowoc Cranes, LLC
European Patent Convention	Filed	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	13153480.2	10/15/2007			Manitowoc Cranes, LLC

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		GHT					
European Patent Convention	Issued	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	13153486.9	1/31/2013	2589565	9/10/2014	Manitowoc Cranes, LLC
European Patent Convention	Filed	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	13155808.2	2/19/2013			Manitowoc Cranes, LLC
European Patent Convention	Filed	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	14183968.8	9/8/2014			Manitowoc Cranes, LLC
European Patent Convention	Filed	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	n/a	9/8/2014			Manitowoc Cranes, LLC
European Patent Convention	Filed	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	07254071.9	10/15/2007			Manitowoc Cranes, LLC
European Patent Convention	Issued	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	08251277.3	4/1/2008	1990306	11/6/2013	Manitowoc Cranes, LLC
Germany	Issued	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	08251277.3	4/1/2008	60200802852.7	11/6/2013	Manitowoc Cranes, LLC
Germany	Issued	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	13153486.9	1/31/2013	2589565	9/10/2014	Manitowoc Cranes, LLC
Germany	Filed	MOBILE LIFT CRANE WITH VARIABLE POSITION	14183968.8	4/1/2008			Manitowoc Cranes, LLC

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		COUNTERWEIGHT					
India	Filed	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	2447/CHE/2014	5/16/2014			Manitowoc Cranes, LLC
India	Issued	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	2456/CHE/2007	10/29/2007	261212	6/12/2014	Manitowoc Cranes, LLC
India	Issued	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	873/CHE/2008	4/8/2008	261232	6/20/2014	Manitowoc Cranes, LLC
Japan	Issued	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	2007-265430	10/11/2007	5297624	6/21/2013	Manitowoc Cranes, LLC
Japan	Issued	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	2008-077842	3/25/2008	5276867	5/24/2013	Manitowoc Cranes, LLC
Russian Federation	Issued	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	2007139810	10/29/2007	2464221	10/20/2012	Manitowoc Cranes, LLC
Russian Federation	Issued	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	2008114296	4/15/2008	2467946	11/27/2012	Manitowoc Cranes, LLC
United States	Issued	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	11/733,104	4/9/2007	7,546,928	6/16/2009	Manitowoc Cranes, LLC
United States	Issued	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	12/023,902	1/31/2008	7,967,158	6/28/2011	Manitowoc Cranes, LLC

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		POSITION COUNTERWEIGHT					
Brazil	Filed	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	PI0704004-0	10/25/2007			Manitowoc Cranes, LLC
Brazil	Filed	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	C10704004-0	4/9/2008			Manitowoc Cranes, LLC
United States	Issued	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	13/752,053	1/28/2013	8,827,092	9/9/2014	Manitowoc Cranes, LLC
United States	Issued	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	13/963,993	8/9/2013	8,985,353	3/24/2015	Manitowoc Cranes, LLC
United States	Filed	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	14/665,886	3/23/2015			Manitowoc Cranes, LLC
United States	Issued	MOBILE LIFT CRANE WITH VARIABLE POSITION COUNTERWEIGHT	13/165,287	6/21/2011	8,511,489	8/20/2013	Manitowoc Cranes, LLC
United States	Docketed	VARIABLE POSITION COUNTERWEIGHT WITH ADDITIONAL EXTENSION					Manitowoc Cranes, LLC
United States	Docketed	LIFT CRANE WITH MOVEABLE COUNTERWEIGHT					Manitowoc Cranes, LLC (from Manitowoc Crane Companies, LLC)

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
Brazil	Filed	LIFT CRANE WITH MOVEABLE COUNTERWEIGHT	PI1004421-3	8/6/2010			Manitowoc Cranes, LLC (from Manitowoc Crane Companies, LLC)
China P.R.	Filed	LIFT CRANE WITH MOVEABLE COUNTERWEIGHT	201010511568.1	8/6/2010			Manitowoc Cranes, LLC (from Manitowoc Crane Companies, LLC)
European Patent Convention	Filed	LIFT CRANE WITH MOVEABLE COUNTERWEIGHT	10172110.8	8/6/2010			Manitowoc Cranes, LLC (from Manitowoc Crane Companies, LLC)
India	Filed	LIFT CRANE WITH MOVEABLE COUNTERWEIGHT	2226/CHE/2010	8/4/2010			Manitowoc Cranes, LLC (from Manitowoc Crane Companies, LLC)
Japan	Filed	LIFT CRANE WITH MOVEABLE COUNTERWEIGHT	2010-175871	8/5/2010			Manitowoc Cranes, LLC (from Manitowoc Crane Companies, LLC)
Russian Federation	Issued	LIFT CRANE WITH MOVEABLE COUNTERWEIGHT	2010133069	8/6/2010	2556678	6/17/2015	Manitowoc Cranes, LLC (from Manitowoc Crane Companies, LLC)
United States	Filed	LIFT CRANE WITH MOVEABLE COUNTERWEIGHT	13/712,774	12/12/2012			Manitowoc Cranes, LLC (from Manitowoc Crane Companies, LLC)
United States	Filed	LIFT CRANE WITH MOVEABLE COUNTERWEIGHT	13/712,766	12/12/2012			Manitowoc Cranes, LLC (from Manitowoc

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		GHT					Crane Companies, LLC)
United States	Filed	LIFT CRANE WITH MOVEABLE COUNTERWEI GHT	12/847,902	7/30/2010			Manitowoc Cranes, LLC (from Manitowoc Crane Companies, LLC)
United States	Docketed	ADUSTABLE LENGTH TENSIONING MEMBER					Manitowoc Crane Companies, LLC
European Patent Convention	Issued	ASSEMBLY TO COUPLE A CONDUIT TO A CRANE	14159490.3	3/13/2014	2778108	10/7/2015	Manitowoc Crane Companies, LLC
Germany	Issued	ASSEMBLY TO COUPLE A CONDUIT TO A CRANE	14159490.3	3/13/2014	602014000302.8	10/7/2015	Manitowoc Crane Companies, LLC
Brazil	Filed	AUTOMATICALLY DEPLOYABLE BOOM EXTENSION AND METHOD OF DEPLOYING SAME	PI0800082-4	2/7/2008			Manitowoc Crane Companies, LLC
China P.R.	Issued	AUTOMATICALLY DEPLOYABLE BOOM EXTENSION AND METHOD OF DEPLOYING SAME	200810004848.6	2/4/2008	200810004848.6	4/6/2011	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	AUTOMATICALLY DEPLOYABLE BOOM EXTENSION AND METHOD OF DEPLOYING SAME	8150930.9	2/1/2008	1955974	3/30/2011	Manitowoc Crane Companies, LLC
Germany	Issued	AUTOMATICALLY DEPLOYABLE BOOM	08150930.9	2/1/2008	602008005798.4	3/30/2011	Manitowoc Crane Companies, LLC

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		EXTENSION AND METHOD OF DEPLOYING SAME					
Hong Kong	Issued	AUTOMATICALLY DEPLOYABLE BOOM EXTENSION AND METHOD OF DEPLOYING SAME	08111715.3	10/24/2008	HK1119647	8/12/2011	Manitowoc Crane Companies, LLC
Japan	Issued	AUTOMATICALLY DEPLOYABLE BOOM EXTENSION AND METHOD OF DEPLOYING SAME	2008-026502	2/6/2008	5150808	12/14/2012	Manitowoc Crane Companies, LLC
United States	Issued	AUTOMATICALLY DEPLOYABLE BOOM EXTENSION AND METHOD OF DEPLOYING SAME	11/703,683	2/8/2007	7,337,912	3/4/2008	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	BOOM HOIST CYLINDER CRANE	05016602.4	4/25/1997	1619159	12/19/2007	Manitowoc Crane Companies, LLC
Germany	Issued	BOOM HOIST CYLINDER CRANE	05016602.4	4/25/1997	69738410.1	12/19/2007	Manitowoc Crane Companies, LLC
Brazil	Filed	BOOM HOIST TRANSPORTATION SYSTEM AND CRANE USING SAME	PI0903953-8	9/21/2009			Manitowoc Crane Companies, LLC
China P.R.	Issued	BOOM HOIST TRANSPORTATION SYSTEM AND CRANE USING SAME	20091017867 5.4	9/21/2009	20091017867 5.4	4/30/2014	Manitowoc Crane Companies, LLC
European Patent Convention	Filed	BOOM HOIST TRANSPORTATION SYSTEM	09252207.7	9/16/2009			Manitowoc Crane Companies,

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
on		AND CRANE USING SAME					LLC
India	Filed	BOOM HOIST TRANSPORTATION SYSTEM AND CRANE USING SAME	2245/CHE/2009	9/16/2009			Manitowoc Crane Companies, LLC
Japan	Issued	BOOM HOIST TRANSPORTATION SYSTEM AND CRANE USING SAME	2009-215428	9/17/2009	5687828	1/30/2015	Manitowoc Crane Companies, LLC
Russian Federation	Issued	BOOM HOIST TRANSPORTATION SYSTEM AND CRANE USING SAME	2009134871	9/18/2009	2514561	3/5/2014	Manitowoc Crane Companies, LLC
United States	Issued	BOOM HOIST TRANSPORTATION SYSTEM AND CRANE USING SAME	12/561,007	9/16/2009	8,622,228	1/7/2014	Manitowoc Crane Companies, LLC
United States	Docketed	BOOM WITH EXPANDABLE CROSS-SECTION FOR A CRANE					Manitowoc Crane Companies, LLC
United States	Docketed	BOOM WITH JOINED DUAL COLUMNS	?				Manitowoc Crane Companies, LLC
United States	Docketed	CAMERA FOR A CRANE					Manitowoc Crane Companies, LLC
Brazil	Filed	CARBODY CONNECTION SYSTEM AND CRANE USING SAME	PI0903479-0	9/22/2009			Manitowoc Crane Companies, LLC
China P.R.	Issued	CARBODY CONNECTION SYSTEM AND CRANE USING SAME	200910174263.3	9/22/2009	ZL200910174263	7/1/2015	Manitowoc Crane Companies, LLC
European Patent Convention	Filed	CARBODY CONNECTION SYSTEM AND CRANE USING SAME	09252205.1	9/16/2009			Manitowoc Crane Companies, LLC
India	Filed	CARBODY CONNECTION SYSTEM AND	2270/CHE/2009	9/18/2009			Manitowoc Crane Companies,

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		CRANE USING SAME					LLC
Japan	Issued	CARBODY CONNECTION SYSTEM AND CRANE USING SAME	2009-215495	9/17/2009	5762675	6/19/2015	Manitowoc Crane Companies, LLC
Russian Federation	Issued	CARBODY CONNECTION SYSTEM AND CRANE USING SAME	2009135281	9/22/2009	2509713	3/20/2014	Manitowoc Crane Companies, LLC
United States	Issued	CARBODY CONNECTION SYSTEM AND CRANE USING SAME	12/561,103	9/16/2009	8,348,073	1/8/2013	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	CARBODY TO CRAWLER CONNECTION	03257420.4	11/25/2003	1426320	6/6/2007	Manitowoc Crane Companies, LLC
Germany	Issued	CARBODY TO CRAWLER CONNECTION	03257420.4	11/25/2003	60314221.4	6/6/2007	Manitowoc Crane Companies, LLC
Japan	Issued	CARBODY TO CRAWLER CONNECTION	2003-407091	12/5/2003	4428996	12/25/2009	Manitowoc Crane Companies, LLC
United States	Issued	CARBODY TO CRAWLER CONNECTION	10/313,266	12/6/2002	7,007,764	3/7/2006	Manitowoc Crane Companies, LLC
Brazil	Filed	COLUMN CONNECTOR SYSTEM	BR102013032709-3	12/18/2013			Manitowoc Crane Companies, LLC
China P.R.	Filed	COLUMN CONNECTOR SYSTEM	2013107105103	12/20/2013			Manitowoc Crane Companies, LLC
European Patent Convention	Filed	COLUMN CONNECTOR SYSTEM	13197111.1	12/13/2013			Manitowoc Crane Companies, LLC
India	Filed	COLUMN CONNECTOR SYSTEM	5931/CHE/2013	12/18/2013			Manitowoc Crane Companies, LLC
Japan	Filed	COLUMN CONNECTOR SYSTEM	2013-263545	12/20/2013			Manitowoc Crane Companies, LLC

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
Russian Federation	Filed	COLUMN CONNECTOR SYSTEM	2013156263	12/18/2013			Manitowoc Crane Companies, LLC
United States	Issued	COLUMN CONNECTOR SYSTEM	14/109,099	12/17/2013	9,051,159	6/9/2015	Manitowoc Crane Companies, LLC
Brazil	Filed	COMPRESSIBLE STOP MEMBER FOR USE ON A CRANE	PI1001920-0	5/20/2010			Manitowoc Crane Companies, LLC
China P.R.	Issued	COMPRESSIBLE STOP MEMBER FOR USE ON A CRANE	201010241257.8	5/20/2010	201010241257.8	2/18/2015	Manitowoc Crane Companies, LLC
European Patent Convention	Filed	COMPRESSIBLE STOP MEMBER FOR USE ON A CRANE	10250949.4	5/19/2010			Manitowoc Crane Companies, LLC
India	Filed	COMPRESSIBLE STOP MEMBER FOR USE ON A CRANE	1407/CHE/2010	5/19/2010			Manitowoc Crane Companies, LLC
Japan	Issued	COMPRESSIBLE STOP MEMBER FOR USE ON A CRANE	2010-115857	5/20/2010	5735757	4/24/2015	Manitowoc Crane Companies, LLC
United States	Issued	COMPRESSIBLE STOP MEMBER FOR USE ON A CRANE	12/781,339	5/17/2010	8,910,807	12/16/2014	Manitowoc Crane Companies, LLC
Austria	Issued	CONNECTION SYSTEM FOR CRANE BOOM SEGMENTS	08253694.7	11/11/2008	2065332	9/24/2014	Manitowoc Crane Companies, LLC
Austria	Filed	CONNECTION SYSTEM FOR CRANE BOOM SEGMENTS	14184310.2	9/10/2014			Manitowoc Crane Companies, LLC
Brazil	Filed	CONNECTION SYSTEM FOR CRANE BOOM SEGMENTS	PI0805009-0	11/28/2008			Manitowoc Crane Companies, LLC
China P.R.	Filed	CONNECTION SYSTEM FOR CRANE BOOM	201510356025.X	6/25/2015			Manitowoc Crane Companies,

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		SEGMENTS					LLC
China P.R.	Issued	CONNECTION SYSTEM FOR CRANE BOOM SEGMENTS	20081017881 6.8	12/1/2008	20081017881 6.8	7/29/2015	Manitowoc Crane Companies, LLC
European Patent Convention	Filed	CONNECTION SYSTEM FOR CRANE BOOM SEGMENTS	14184310.2	9/10/2014			Manitowoc Crane Companies, LLC
European Patent Convention	Filed	CONNECTION SYSTEM FOR CRANE BOOM SEGMENTS	15200561.7	12/16/2015			Manitowoc Crane Companies, LLC
European Patent Convention	Issued	CONNECTION SYSTEM FOR CRANE BOOM SEGMENTS	08253694.7	11/11/2008	2065332	9/24/2014	Manitowoc Crane Companies, LLC
Germany	Issued	CONNECTION SYSTEM FOR CRANE BOOM SEGMENTS	08253694.7	11/11/2008	60200803452 9.7	9/24/2014	Manitowoc Crane Companies, LLC
Germany	Filed	CONNECTION SYSTEM FOR CRANE BOOM SEGMENTS	14184310.2	9/10/2014			Manitowoc Crane Companies, LLC
India	Filed	CONNECTION SYSTEM FOR CRANE BOOM SEGMENTS	2993/CHE/2008	11/28/2008			Manitowoc Crane Companies, LLC
Japan	Filed	CONNECTION SYSTEM FOR CRANE BOOM SEGMENTS	2015-205650	11/5/2008			Manitowoc Crane Companies, LLC
Japan	Filed	CONNECTION SYSTEM FOR CRANE BOOM SEGMENTS	2008-284263	11/5/2008			Manitowoc Crane Companies, LLC
Russian Federation	Filed	CONNECTION SYSTEM FOR CRANE BOOM SEGMENTS	2014123123	6/6/2014			Manitowoc Crane Companies, LLC
Russian Federation	Issued	CONNECTION SYSTEM FOR CRANE BOOM SEGMENTS	2008146869	11/27/2008	2525162	6/11/2014	Manitowoc Crane Companies, LLC
United States	Issued	CONNECTION SYSTEM FOR CRANE BOOM SEGMENTS	13/154,236	6/6/2011	8,534,474	9/17/2013	Manitowoc Crane Companies, LLC
United States	Issued	CONNECTION SYSTEM FOR CRANE BOOM SEGMENTS	13/912,884	6/7/2013	9,187,296	11/17/2015	Manitowoc Crane Companies, LLC

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United States	Issued	CONNECTION SYSTEM FOR CRANE BOOM SEGMENTS	12/273,310	11/18/2008	7,954,657	6/7/2011	Manitowoc Crane Companies, LLC
United States	Issued	CONNECTION SYSTEM FOR CRANE COMPONENTS	13/846,498	3/18/2013	9,121,425	9/1/2015	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	CONTROL AND HYDRAULIC SYSTEM FOR A LIFTCRANE	00300170.8	1/11/2000	1022247	4/18/2007	Manitowoc Crane Companies, LLC
Germany	Issued	CONTROL AND HYDRAULIC SYSTEM FOR A LIFTCRANE	00300170.8	1/11/2000	60034387.1	4/18/2007	Manitowoc Crane Companies, LLC
Japan	Issued	CONTROL AND HYDRAULIC SYSTEM FOR A LIFTCRANE	2000-012094	1/20/2000	4585642	9/10/2010	Manitowoc Crane Companies, LLC
United States	Issued	CONTROL AND HYDRAULIC SYSTEM FOR A LIFTCRANE	09/233,927	1/20/1999	6,269,635	8/7/2001	Manitowoc Crane Companies, LLC
Chile	Filed	CONTROL CONSOLE	913-2008	3/28/2008			Manitowoc Crane Companies, LLC
China P.R.	Issued	CONTROL CONSOLE HAVING MULTIPLE USE POSITIONS	20081008624 6.X	3/24/2008	20081008624 6.X	9/19/2012	Manitowoc Crane Companies, LLC
United States	Issued	CONTROL CONSOLE HAVING MULTIPLE USE POSITIONS	11/730,371	3/30/2007	7,681,687	3/23/2010	Manitowoc Crane Companies, LLC
Brazil	Filed	CONTROL CONSOLE HAVING MULTIPLE USE POSITIONS	PI0800779-9	3/27/2008			Manitowoc Crane Companies, LLC
Japan	Issued	CONTROL CONSOLE HAVING	2008-85595	3/28/2008	4902581	1/13/2012	Manitowoc Crane Companies,

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		MULTIPLE USE POSITIONS					LLC
Mexico	Issued	CONTROL CONSOLE HAVING MULTIPLE USE POSITIONS	MX/a/2008/004250	3/28/2008	284548	3/9/2011	Manitowoc Crane Companies, LLC
Japan	Issued	COUNTER WEIGHT HANDLING SYSTEM	2007-121831	4/25/1997	4108727	4/11/2008	Manitowoc Crane Companies, LLC
India	Filed	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	595/CHE/2010	3/8/2010			Manitowoc Crane Companies, LLC
Austria	Issued	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	10250425.5	3/9/2010	2243741	4/17/2013	Manitowoc Crane Companies, LLC
Austria	Issued	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	12184080.5	9/12/2012	2543621	9/25/2013	Manitowoc Crane Companies, LLC
Austria	Issued	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	12192250.4	11/12/2012	2559650	11/13/2013	Manitowoc Crane Companies, LLC
Austria	Issued	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	12192257.9	11/12/2012	2559651	4/16/2014	Manitowoc Crane Companies, LLC
Brazil	Filed	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	PI1000852-7	3/9/2010			Manitowoc Crane Companies, LLC
China P.R.	Filed	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	201410561758.2	10/22/2014			Manitowoc Crane Companies, LLC
China P.R.	Filed	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	201410561760.X	10/22/2014			Manitowoc Crane Companies, LLC

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China P.R.	Issued	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	20101017677 8.X	3/9/2010	20101017677 8.X	12/10/2014	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	12184080.5	9/12/2012	2543621	9/25/2013	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	12192250.4	11/12/2012	2559650	11/13/2013	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	12192257.9	11/12/2012	2559651	4/16/2014	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	10250425.5	3/9/2010	2243741	4/17/2013	Manitowoc Crane Companies, LLC
Germany	Issued	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	10250425.5	3/9/2010	60201000624 8.1	4/17/2013	Manitowoc Crane Companies, LLC
Germany	Issued	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	12184080.5	9/12/2012	2543621	9/25/2013	Manitowoc Crane Companies, LLC
Germany	Issued	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	12192250.4	11/12/2012	2559650	11/13/2013	Manitowoc Crane Companies, LLC
Germany	Issued	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	12192257.9	11/12/2012	2559651	4/16/2014	Manitowoc Crane Companies, LLC
Japan	Filed	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	2014-255718	12/18/2014			Manitowoc Crane Companies, LLC
Japan	Filed	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	2014-255731	12/18/2014			Manitowoc Crane Companies,

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		ASSEMBLIES FOR CRANES					LLC
Japan	Issued	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	2014-255735	12/18/2014	5848429	12/4/2015	Manitowoc Crane Companies, LLC
Japan	Issued	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	2010-051457	3/9/2010	5670641	12/26/2014	Manitowoc Crane Companies, LLC
Russian Federation	Issued	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	2010108363	3/9/2010	2521085	4/29/2014	Manitowoc Crane Companies, LLC
United States	Issued	COUNTERWEIGHT BLOCK AND ASSEMBLIES FOR CRANES	12/718,156	3/5/2010	8,960,460	2/24/2015	Manitowoc Crane Companies, LLC
United States	Issued	COUNTERWEIGHT HANDLING SYSTEM FOR RING-SUPPORTED CRANES	08/792,681	1/29/1997	5,941,401	8/24/1999	Manitowoc Crane Companies, LLC
Austria	Issued	CRANE BACKSTAY SPREADER	10250882.7	5/6/2010	2253575	1/16/2013	Manitowoc Crane Companies, LLC
Brazil	Filed	CRANE BACKSTAY SPREADER	PI1001630-9	5/20/2010			Manitowoc Crane Companies, LLC
China P.R.	Issued	CRANE BACKSTAY SPREADER	201010181867.3	5/20/2010	201010181867.3	10/1/2014	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	CRANE BACKSTAY SPREADER	10250882.7	5/6/2010	2253575	1/16/2013	Manitowoc Crane Companies, LLC
Germany	Issued	CRANE BACKSTAY SPREADER	10250882.7	5/6/2010	2253575	1/16/2013	Manitowoc Crane Companies, LLC
India	Filed	CRANE BACKSTAY SPREADER	1366/CHE/2010	5/14/2010			Manitowoc Crane Companies, LLC

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Japan	Issued	CRANE BACKSTAY SPREADER	2010-113834	5/18/2010	5758588	6/12/2015	Manitowoc Crane Companies, LLC
Russian Federation	Issued	CRANE BACKSTAY SPREADER	2010120193	5/20/2010	2532204	9/4/2014	Manitowoc Crane Companies, LLC
United States	Issued	CRANE BACKSTAY SPREADER	12/777,094	5/10/2010	8,127,949	3/6/2012	Manitowoc Crane Companies, LLC
Russian Federation	Issued	CRANE BOOM STOP COMPRESSIBLE STOP MEMBER FOR USE ON A CRANE-old title	2010120194	5/20/2010	2544255	2/6/2015	Manitowoc Crane Companies, LLC
Austria	Issued	CRANE HOOK BLOCK	10250333.1	2/25/2010	2261163	7/4/2012	Manitowoc Crane Companies, LLC
Austria	Issued	CRANE HOOK BLOCK	12168110.0	2/25/2010	2489624	8/26/2015	Manitowoc Crane Companies, LLC
Austria	Issued	CRANE HOOK BLOCK	12168103.5	2/25/2010	2489623	9/16/2015	Manitowoc Crane Companies, LLC
Austria	Issued	CRANE HOOK BLOCK	13174948.3	7/3/2013	2662324	10/21/2015	Manitowoc Crane Companies, LLC
Belgium	Issued	CRANE HOOK BLOCK	12168110.0	2/25/2010	2489624	8/26/2015	Manitowoc Crane Companies, LLC
Belgium	Issued	CRANE HOOK BLOCK	12168103.5	2/25/2010	2489623	9/16/2015	Manitowoc Crane Companies, LLC
Belgium	Issued	CRANE HOOK BLOCK	13174948.3	7/3/2013	2662324	10/21/2015	Manitowoc Crane Companies, LLC
Brazil	Filed	CRANE HOOK BLOCK	BR122013004009-9	2/25/2010			Manitowoc Crane Companies, LLC
Brazil	Filed	CRANE HOOK	BR12201300	2/25/2010			Manitowoc

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		BLOCK	4007-2				Crane Companies, LLC
Brazil	Filed	CRANE HOOK BLOCK	PI1001020-3	2/25/2010			Manitowoc Crane Companies, LLC
China P.R.	Issued	CRANE HOOK BLOCK	20101014846 7.2	2/25/2010	20101014846 7.2	12/3/2014	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	CRANE HOOK BLOCK	12168103.5	2/25/2010	2489623	9/16/2015	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	CRANE HOOK BLOCK	12168110.0	2/25/2010	2489624	8/26/2015	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	CRANE HOOK BLOCK	13174948.3	7/3/2013	2662324	10/21/2015	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	CRANE HOOK BLOCK	10250333.1	2/25/2010	2261163	7/4/2012	Manitowoc Crane Companies, LLC
France	Issued	CRANE HOOK BLOCK	12168110.0	2/25/2010	2489624	8/26/2015	Manitowoc Crane Companies, LLC
France	Issued	CRANE HOOK BLOCK	12168103.5	2/25/2010	2489623	9/16/2015	Manitowoc Crane Companies, LLC
France	Issued	CRANE HOOK BLOCK	13174948.3	7/3/2013	2662324	10/21/2015	Manitowoc Crane Companies, LLC
Germany	Issued	CRANE HOOK BLOCK	10250333.1	2/25/2010	60201000210 3.3	7/4/2012	Manitowoc Crane Companies, LLC
Germany	Issued	CRANE HOOK BLOCK	12168110.0	2/25/2010	2489624	8/26/2015	Manitowoc Crane Companies, LLC
Germany	Issued	CRANE HOOK BLOCK	12168103.5	2/25/2010	2489623	9/16/2015	Manitowoc Crane Companies, LLC
Germany	Issued	CRANE HOOK BLOCK	13174948.3	7/3/2013	60201002853 3.2	10/21/2015	Manitowoc Crane

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							Companies, LLC
Great Britain	Issued	CRANE HOOK BLOCK	12168110.0	2/25/2010	2489624	8/26/2015	Manitowoc Crane Companies, LLC
Great Britain	Issued	CRANE HOOK BLOCK	12168103.5	2/25/2010	2489623	9/16/2015	Manitowoc Crane Companies, LLC
Great Britain	Issued	CRANE HOOK BLOCK	13174948.3	7/3/2013	2662324	10/21/2015	Manitowoc Crane Companies, LLC
India	Filed	CRANE HOOK BLOCK	466/CHE/2010	2/23/2010			Manitowoc Crane Companies, LLC
Japan	Issued	CRANE HOOK BLOCK	2010-038624	2/24/2010	5715760	3/20/2015	Manitowoc Crane Companies, LLC
Netherlands	Issued	CRANE HOOK BLOCK	12168110.0	2/25/2010	2489624	8/26/2015	Manitowoc Crane Companies, LLC
Netherlands	Issued	CRANE HOOK BLOCK	12168103.5	2/25/2010	2489623	9/16/2015	Manitowoc Crane Companies, LLC
Netherlands	Issued	CRANE HOOK BLOCK	13174948.3	7/3/2013	2662324	10/21/2015	Manitowoc Crane Companies, LLC
Russian Federation	Issued	CRANE HOOK BLOCK	2010106234	2/24/2010	2521088	4/29/2014	Manitowoc Crane Companies, LLC
United States	Issued	CRANE HOOK BLOCK	12/709,678	2/22/2010	7,946,560	5/24/2011	Manitowoc Crane Companies, LLC
United States	Issued	CRANE HOOK BLOCK	13/043,019	3/8/2011	8,608,134	12/17/2013	Manitowoc Crane Companies, LLC
Brazil	Filed	CRANE MONITORING SYSTEM	BR112014027980-2	5/9/2013			Manitowoc Crane Companies, LLC
China P.R.	Filed	CRANE MONITORING SYSTEM	201380036853.4	5/9/2013			Manitowoc Crane Companies,

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							LLC
European Patent Convention	Filed	CRANE MONITORING SYSTEM	13787556.3	5/9/2013			Manitowoc Crane Companies, LLC
Japan	Filed	CRANE MONITORING SYSTEM	2015-511703	5/9/2013			Manitowoc Crane Companies, LLC
Russian Federation	Filed	CRANE MONITORING SYSTEM	2014148911	5/9/2013			Manitowoc Crane Companies, LLC
United States	Filed	CRANE MONITORING SYSTEM	14/399,766	5/9/2013			Manitowoc Crane Companies, LLC
Austria	Issued	CRANE WITH BOOM RAISING ASSIST STRUCTURE	10250854.6	4/28/2010	2246289	5/20/2015	Manitowoc Crane Companies, LLC
Belgium	Issued	CRANE WITH BOOM RAISING ASSIST STRUCTURE	10250854.6	4/28/2010	2246289	5/20/2015	Manitowoc Crane Companies, LLC
Brazil	Filed	CRANE WITH BOOM RAISING ASSIST STRUCTURE	PI1001609-0	4/30/2010			Manitowoc Crane Companies, LLC
China P.R.	Issued	CRANE WITH BOOM RAISING ASSIST STRUCTURE	20101020339.6.1	4/30/2010	20101020339.6.1	4/1/2015	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	CRANE WITH BOOM RAISING ASSIST STRUCTURE	10250854.6	4/28/2010	2246289	5/20/2015	Manitowoc Crane Companies, LLC
France	Issued	CRANE WITH BOOM RAISING ASSIST STRUCTURE	10250854.6	4/28/2010	2246289	5/20/2015	Manitowoc Crane Companies, LLC
Germany	Issued	CRANE WITH BOOM RAISING ASSIST STRUCTURE	10250854.6	4/28/2010	2246289	5/20/2015	Manitowoc Crane Companies, LLC
Great	Issued	CRANE WITH	10250854.6	4/28/2010	2246289	5/20/20	Manitowoc

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Britain		BOOM RAISING ASSIST STRUCTURE				15	Crane Companies, LLC
India	Filed	CRANE WITH BOOM RAISING ASSIST STRUCTURE	1178/CHE/2010	4/28/2010			Manitowoc Crane Companies, LLC
Japan	Filed	CRANE WITH BOOM RAISING ASSIST STRUCTURE	2015-142773	7/17/2015			Manitowoc Crane Companies, LLC
Netherlands	Issued	CRANE WITH BOOM RAISING ASSIST STRUCTURE	10250854.6	4/28/2010	2246289	5/20/2015	Manitowoc Crane Companies, LLC
Russian Federation	Issued	CRANE WITH BOOM RAISING ASSIST STRUCTURE	2010117268	4/30/2010	2542831	1/23/2015	Manitowoc Crane Companies, LLC
United States	Issued	CRANE WITH BOOM RAISING ASSIST STRUCTURE	12/764,734	4/21/2010	8,684,197	4/1/2014	Manitowoc Crane Companies, LLC
China P.R.	Issued	CRANE WITH SELF-RAISING MAST	03104348.8	2/8/2003	ZL03104348.8	8/22/2007	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	CRANE WITH SELF-RAISING MAST	03250661.0	2/3/2003	1333004	9/17/2008	Manitowoc Crane Companies, LLC
Germany	Issued	CRANE WITH SELF-RAISING MAST	03250661.0	2/3/2003	60323551.4	9/17/2008	Manitowoc Crane Companies, LLC
Japan	Issued	CRANE WITH SELF-RAISING MAST	2003-065740	2/4/2003	4455828	2/12/2010	Manitowoc Crane Companies, LLC
United States	Issued	CRANE WITH SELF-RAISING MAST	10/068,563	2/4/2002	6,695,158	2/24/2004	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	CRAWLER CRANE HAVING IDENTICAL	01301383.4	2/16/2001	1125832	5/6/2009	Manitowoc Crane Companies, LLC

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		LEFT AND RIGHT CRAWLER ASSEMBLIES					
Germany	Issued	CRAWLER CRANE HAVING IDENTICAL LEFT AND RIGHT CRAWLER ASSEMBLIES	01301383.4	2/16/2001	60138581.0	5/6/2009	Manitowoc Crane Companies, LLC
Japan	Issued	CRAWLER CRANE HAVING IDENTICAL LEFT AND RIGHT CRAWLER ASSEMBLIES	2001-088770	2/19/2001	5129416	11/9/2012	Manitowoc Crane Companies, LLC
United States	Issued	CRAWLER CRANE HAVING IDENTICAL LEFT AND RIGHT CRAWLER ASSEMBLIES	09/753,912	1/3/2001	6,857,489	2/22/2005	Manitowoc Crane Companies, LLC
Japan	Filed	CRAWLER WITH TRACK CONNECTION SYSTEM, LIFT CRANE WITH THE CRAWLER, AND METHOD OF CONNECTING ENDS OF TRACK ON THE CRAWLER	2014-258279	12/22/2014			Manitowoc Crane Companies, LLC
Japan	Filed	CRAWLER WITH TRACK TENSIONING SYSTEM, LIFT CRANE WITH THE CRAWLER, AND METHOD OF TENSIONING TRACK ON	2014-258292	12/22/2014			Manitowoc Crane Companies, LLC

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		THE CRAWLER					
Austria	Issued	DRIVE TUMBLER AND TRACK DRIVE FOR MOBILE VEHICLES, INCLUDING LIFT CRANES	09250298.8	2/5/2009	2088063	11/7/2012	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	DRIVE TUMBLER AND TRACK DRIVE FOR MOBILE VEHICLES, INCLUDING LIFT CRANES	09250298.8	2/5/2009	2088063	11/7/2012	Manitowoc Crane Companies, LLC
Germany	Issued	DRIVE TUMBLER AND TRACK DRIVE FOR MOBILE VEHICLES, INCLUDING LIFT CRANES	09250298.8	2/5/2009	602009010989.8	11/7/2012	Manitowoc Crane Companies, LLC
United States	Issued	DRIVE TUMBLER AND TRACK DRIVE FOR MOBILE VEHICLES, INCLUDING LIFT CRANES	12/368,143	2/9/2009	8,075,069	12/13/2011	Manitowoc Crane Companies, LLC
Brazil	Filed	DRIVE TUMBLER, TRACK DRIVE, AND TRACK CONNECTION AND TENSIONING SYSTEM	PI0900387-8	2/11/2009			Manitowoc Crane Companies, LLC
China P.R.	Issued	DRIVE TUMBLER, TRACK DRIVE, AND TRACK CONNECTION AND TENSIONING SYSTEM	201210236333.5	6/29/2012	201210236333.5	10/7/2015	Manitowoc Crane Companies, LLC
China P.R.	Filed	DRIVE TUMBLER, TRACK DRIVE,	201510567752.0	9/8/2015			Manitowoc Crane Companies,

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		AND TRACK CONNECTION AND TENSIONING SYSTEM					LLC
China P.R.	Filed	DRIVE TUMBLER, TRACK DRIVE, AND TRACK CONNECTION AND TENSIONING SYSTEM	20151056817 7.6	9/8/2015			Manitowoc Crane Companies, LLC
China P.R.	Issued	DRIVE TUMBLER, TRACK DRIVE, AND TRACK CONNECTION AND TENSIONING SYSTEM	20091013076 5.6	2/11/2009	20091013076 5.6	8/22/2012	Manitowoc Crane Companies, LLC
India	Filed	DRIVE TUMBLER, TRACK DRIVE, AND TRACK CONNECTION AND TENSIONING SYSTEM	283/CHE/2009	2/10/2009			Manitowoc Crane Companies, LLC
Japan	Issued	DRIVE TUMBLER, TRACK DRIVE, AND TRACK CONNECTION AND TENSIONING SYSTEM	2013-038613	2/28/2013	5675871	1/9/2015	Manitowoc Crane Companies, LLC
Japan	Issued	DRIVE TUMBLER, TRACK DRIVE, AND TRACK CONNECTION AND TENSIONING SYSTEM	2009-029426	2/12/2009	5215208	3/8/2013	Manitowoc Crane Companies, LLC
Russian Federation	Filed	DRIVE TUMBLER, TRACK DRIVE, AND TRACK CONNECTION AND TENSIONING SYSTEM	2013127623	6/18/2013			Manitowoc Crane Companies, LLC

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Russian Federation	Issued	DRIVE TUMBLER, TRACK DRIVE, AND TRACK CONNECTION AND TENSIONING SYSTEM	2009104741	2/11/2009	2492095	9/10/2013	Manitowoc Crane Companies, LLC
Brazil	Filed	DRUM FRAME SYSTEM FOR CRANES	PI0905403-0	9/21/2009			Manitowoc Crane Companies, LLC
China P.R.	Issued	DRUM FRAME SYSTEM FOR CRANES	20091017867 7.3	9/21/2009	20091017867 7.3	12/24/2014	Manitowoc Crane Companies, LLC
United States	Issued	DRUM FRAME SYSTEM FOR CRANES	12/561,094	9/16/2009	8,397,924	3/19/2013	Manitowoc Crane Companies, LLC
Austria	Issued	DRUM TENSIONING METHOD AND APPARATUS FOR LOAD HOIST WIRE ROPE	E627945	7/27/2010	2279978	8/21/2013	Manitowoc Crane Companies, LLC
Brazil	Filed	DRUM TENSIONING METHOD AND APPARATUS FOR LOAD HOIST WIRE ROPE	PI1010344-9	7/28/2010			Manitowoc Crane Companies, LLC
China P.R.	Issued	DRUM TENSIONING METHOD AND APPARATUS FOR LOAD HOIST WIRE ROPE	20101051078 6.3	7/28/2010	20101051078 6.3	11/27/2013	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	DRUM TENSIONING METHOD AND APPARATUS FOR LOAD HOIST WIRE ROPE	10170919.4	7/27/2010	2279978	8/21/2013	Manitowoc Crane Companies, LLC
Germany	Issued	DRUM TENSIONING METHOD AND APPARATUS FOR LOAD	60 2010 009 585.1	7/27/2010	2279978	8/21/2013	Manitowoc Crane Companies, LLC

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		HOIST WIRE ROPE					
India	Filed	DRUM TENSIONING METHOD AND APPARATUS FOR LOAD HOIST WIRE ROPE	2122/CHE/2010	7/26/2010			Manitowoc Crane Companies, LLC
Japan	Issued	DRUM TENSIONING METHOD AND APPARATUS FOR LOAD HOIST WIRE ROPE	2010-168857	7/28/2010	5758598	6/12/2015	Manitowoc Crane Companies, LLC
United States	Issued	DRUM TENSIONING METHOD AND APPARATUS FOR LOAD HOIST WIRE ROPE	12/844,643	7/27/2010	8,640,895	2/4/2014	Manitowoc Crane Companies, LLC
Austria	Issued	FOLDING JIB MAIN STRUT AND TRANSPORTABLE REEVED STRUT CAPS	10250626.8	3/29/2010	2256078	5/30/2012	Manitowoc Crane Companies, LLC
Austria	Issued	FOLDING JIB MAIN STRUT AND TRANSPORTABLE REEVED STRUT CAPS	12161916.7	3/29/2010	2492235	9/30/2015	Manitowoc Crane Companies, LLC
Belgium	Issued	FOLDING JIB MAIN STRUT AND TRANSPORTABLE REEVED STRUT CAPS	12161916.7	3/29/2010	2492235	9/30/2015	Manitowoc Crane Companies, LLC
Brazil	Filed	FOLDING JIB MAIN STRUT AND TRANSPORTABLE REEVED STRUT CAPS	PI1001533-7	3/30/2010			Manitowoc Crane Companies, LLC
China P.R.	Issued	FOLDING JIB MAIN STRUT AND TRANSPORTABLE REEVED STRUT CAPS	201010176668.3	3/31/2010	ZL201010176668	3/25/2015	Manitowoc Crane Companies, LLC

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European Patent Convention	Issued	FOLDING JIB MAIN STRUT AND TRANSPORTABLE REEVED STRUT CAPS	12161916.7	3/29/2010	2492235	9/30/2015	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	FOLDING JIB MAIN STRUT AND TRANSPORTABLE REEVED STRUT CAPS	10250626.8	3/29/2010	2256078	5/30/2012	Manitowoc Crane Companies, LLC
France	Issued	FOLDING JIB MAIN STRUT AND TRANSPORTABLE REEVED STRUT CAPS	12161916.7	3/29/2010	2492235	9/30/2015	Manitowoc Crane Companies, LLC
Germany	Issued	FOLDING JIB MAIN STRUT AND TRANSPORTABLE REEVED STRUT CAPS	10250626.8	3/29/2010	602010001772.9	5/30/2012	Manitowoc Crane Companies, LLC
Germany	Issued	FOLDING JIB MAIN STRUT AND TRANSPORTABLE REEVED STRUT CAPS	12161916.7	3/29/2010	2492235	9/30/2015	Manitowoc Crane Companies, LLC
Great Britain	Issued	FOLDING JIB MAIN STRUT AND TRANSPORTABLE REEVED STRUT CAPS	12161916.7	3/29/2010	2492235	9/30/2015	Manitowoc Crane Companies, LLC
India	Filed	FOLDING JIB MAIN STRUT AND TRANSPORTABLE REEVED STRUT CAPS	825/CHE/2010	3/26/2010			Manitowoc Crane Companies, LLC
Japan	Issued	FOLDING JIB MAIN STRUT AND TRANSPORTABLE REEVED STRUT CAPS	2010-076746	3/30/2010	5693031	2/13/2015	Manitowoc Crane Companies, LLC
Netherlands	Issued	FOLDING JIB MAIN STRUT AND TRANSPORTABLE REEVED	12161916.7	3/29/2010	2492235	9/30/2015	Manitowoc Crane Companies, LLC

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		STRUT CAPS					
Russian Federation	Issued	FOLDING JIB MAIN STRUT AND TRANSPORTABLE REEVED STRUT CAPS	2010112249	3/30/2010	2542828	1/23/2015	Manitowoc Crane Companies, LLC
United States	Issued	FOLDING JIB MAIN STRUT AND TRANSPORTABLE REEVED STRUT CAPS	12/730,421	3/24/2010	8,839,966	9/23/2014	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	FOUR TRACK CRAWLER CRANE	99302402.5	3/29/1999	0945393	10/26/2005	Manitowoc Crane Companies, LLC
Germany	Issued	FOUR TRACK CRAWLER CRANE	99302402.5	3/29/1999	69927865.1	10/26/2005	Manitowoc Crane Companies, LLC
Japan	Issued	FOUR TRACK CRAWLER CRANE	11-126222	3/29/1999	4460674	2/19/2010	Manitowoc Crane Companies, LLC
Japan	Issued	FOUR TRACK CRAWLER CRANE	2009-215027	9/16/2009	4881414	12/9/2011	Manitowoc Crane Companies, LLC
United States	Issued	FOUR TRACK CRAWLER CRANE	09/277,364	12/13/2002	6,588,521	7/8/2003	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	FREE FALL DISCONNECT	98302170.0	3/24/1998	0869099	12/22/2004	Manitowoc Crane Companies, LLC
Germany	Issued	FREE FALL DISCONNECT	98302170.0	3/24/1998	P69828213.2	12/22/2004	Manitowoc Crane Companies, LLC
Japan	Issued	FREE FALL DISCONNECT	10-88769	4/1/1998	4108176	4/11/2008	Manitowoc Crane Companies, LLC
United States	Issued	FREE FALL DISCONNECT	08/834,724	12/10/1999	6,244,449	6/12/2001	Manitowoc Crane Companies, LLC
Japan	Issued	HYDRAULIC BOOM HOIST CYLINDER CRANE	09144441	4/25/1997	3980123	7/6/2007	Manitowoc Crane Companies, LLC

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
United States	Issued	HYDRAULIC BOOM HOIST CYLINDER CRANE	08/842,974	5/10/1999	6,062,405	5/16/2000	Manitowoc Crane Companies, LLC
Japan	Issued	HYDRAULIC SYSTEM FOR BOOM HOIST CYLINDER CRANE	2007-96748	4/2/2007	4113240	4/18/2008	Manitowoc Crane Companies, LLC
United States	Issued	HYDRAULIC SYSTEM FOR BOOM HOIST CYLINDER CRANE	09/175,065	10/19/1998	6,481,202	11/19/2002	Manitowoc Crane Companies, LLC
Austria	Issued	HYDRAULIC SYSTEM THERMAL CONTRACTION COMPENSATION APPARATUS AND METHOD	10151190.5	1/20/2010	2210852	2/25/2015	Manitowoc Crane Companies, LLC
Brazil	Filed	HYDRAULIC SYSTEM THERMAL CONTRACTION COMPENSATION APPARATUS AND METHOD	PI 1000112-3	1/19/2010			Manitowoc Crane Companies, LLC
China P.R.	Issued	HYDRAULIC SYSTEM THERMAL CONTRACTION COMPENSATION APPARATUS AND METHOD	20101000448 0.0	1/21/2010	20101000448 0.0	9/9/2015	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	HYDRAULIC SYSTEM THERMAL CONTRACTION COMPENSATION APPARATUS AND METHOD	10151190.5	1/20/2010	2210852	2/25/2015	Manitowoc Crane Companies, LLC
France	Issued	HYDRAULIC SYSTEM THERMAL	10151190.5	1/20/2010	2210852	2/25/2015	Manitowoc Crane Companies,

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		CONTRACTIO N COMPENSATI ON APPARATUS AND METHOD					LLC
Germany	Issued	HYDRAULIC SYSTEM THERMAL CONTRACTIO N COMPENSATI ON APPARATUS AND METHOD	10151190.5	1/20/2010	60201002241 9.8	2/25/20 15	Manitowoc Crane Companies, LLC
Hong Kong	Filed	HYDRAULIC SYSTEM THERMAL CONTRACTIO N COMPENSATI ON APPARATUS AND METHOD	10109240.7	9/28/2010			Manitowoc Crane Companies, LLC
India	Filed	HYDRAULIC SYSTEM THERMAL CONTRACTIO N COMPENSATI ON APPARATUS AND METHOD	42/KOL/2010	1/19/2010			Manitowoc Crane Companies, LLC
Italy	Issued	HYDRAULIC SYSTEM THERMAL CONTRACTIO N COMPENSATI ON APPARATUS AND METHOD	10151190.5	1/20/2010	2210852	2/25/20 15	Manitowoc Crane Companies, LLC
Japan	Issued	HYDRAULIC SYSTEM THERMAL CONTRACTIO N COMPENSATI ON APPARATUS AND METHOD	2010-10029	1/20/2010	5295141	6/21/20 13	Manitowoc Crane Companies, LLC
Russian Federatio	Issued	HYDRAULIC SYSTEM	2010101159	1/18/2010	2423313	7/10/20 11	Manitowoc Crane

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
n		THERMAL CONTRACTIO N COMPENSATI ON APPARATUS AND METHOD					Companies, LLC
Spain	Issued	HYDRAULIC SYSTEM THERMAL CONTRACTIO N COMPENSATI ON APPARATUS AND METHOD	10151190.5	1/20/2010	2210852	2/25/20 15	Manitowoc Crane Companies, LLC
United States	Issued	HYDRAULIC SYSTEM THERMAL CONTRACTIO N COMPENSATI ON APPARATUS AND METHOD	12/559,253	9/14/2009	8,631,651	1/21/20 14	Manitowoc Crane Companies, LLC
United States	Filed	HYDRAULIC SYSTEM THERMAL CONTRACTIO N COMPENSATI ON APPARATUS AND METHOD	14/158,226	1/17/2014			Manitowoc Crane Companies, LLC
Patent Cooperati on Treaty	Filed	LIFT CRANE WITH MAST- RAISING MECHANISM	PCT/US2015/ 012936	1/26/2015			Manitowoc Crane Companies, LLC
United States	Filed	LIFT CRANE WITH MAST- RAISING MECHANISM	14/605,806	1/26/2015			Manitowoc Crane Companies, LLC
European Patent Conventi on	Issued	LIFT METHOD AND APPARATUS WITH FLOATING LIFT CYLINDER ATTACHMENT	99120879.4	10/27/1999	1016618	10/18/2 006	Manitowoc Crane Companies, LLC
South Korea	Issued	LIFT METHOD AND APPARATUS	10-1999- 0048220	11/2/1999	497291	6/16/20 05	Manitowoc Crane Companies,

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		WITH FLOATING LIFT CYLINDER ATTACHMENT					LLC
United States	Issued	LIFTCRANE WITH SYNCHRONOUS ROPE OPERATION	08/748,986	2/7/2000	6,758,356	7/6/2004	Manitowoc Crane Companies, LLC
Australia	Issued	LOAD MONITORING AND CONTROL SYSTEM WITH SELECTIVE BOOM-UP LOCKOUT	2009202448	6/19/2009	2009202448	1/13/2011	Manitowoc Crane Companies, LLC
United States	Issued	LOAD MONITORING AND CONTROL SYSTEM WITH SELECTIVE BOOM-UP LOCKOUT	12/219,112	7/16/2008	7,677,401	3/16/2010	Manitowoc Crane Companies, LLC
Austria	Issued	MAST RAISING STRUCTURE AND PROCESS FOR HIGH-CAPACITY MOBILE LIFT CRANE	08251494.4	4/22/2008	1985573	9/4/2013	Manitowoc Crane Companies, LLC
Brazil	Filed	MAST RAISING STRUCTURE AND PROCESS FOR HIGH-CAPACITY MOBILE LIFT CRANE	PI0801187-7	4/25/2008			Manitowoc Crane Companies, LLC
China P.R.	Issued	MAST RAISING STRUCTURE AND PROCESS FOR HIGH-CAPACITY MOBILE LIFT CRANE	20081009485.2.6	4/28/2008	20081009485.2.6	6/20/2012	Manitowoc Crane Companies, LLC
European Patent Conventi	Issued	MAST RAISING STRUCTURE	08251494.4	4/22/2008	1985573	9/4/2013	Manitowoc Crane Companies,

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
on		AND PROCESS FOR HIGH-CAPACITY MOBILE LIFT CRANE					LLC
Germany	Issued	MAST RAISING STRUCTURE AND PROCESS FOR HIGH-CAPACITY MOBILE LIFT CRANE	08251494.4	4/22/2008	602008027269.9	9/4/2013	Manitowoc Crane Companies, LLC
India	Filed	MAST RAISING STRUCTURE AND PROCESS FOR HIGH-CAPACITY MOBILE LIFT CRANE	1029/CHE/2008	4/25/2008			Manitowoc Crane Companies, LLC
Japan	Issued	MAST RAISING STRUCTURE AND PROCESS FOR HIGH-CAPACITY MOBILE LIFT CRANE	2008-105494	4/15/2008	5475960	2/14/2014	Manitowoc Crane Companies, LLC
Russian Federation	Issued	MAST RAISING STRUCTURE AND PROCESS FOR HIGH-CAPACITY MOBILE LIFT CRANE	2008116159	4/25/2008	2476371	2/27/2013	Manitowoc Crane Companies, LLC
United States	Issued	MAST RAISING STRUCTURE AND PROCESS FOR HIGH-CAPACITY MOBILE LIFT CRANE	11/740,726	4/26/2007	7,762,412	7/27/2010	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	MECHANICAL TRACK DRIVE	98302171.8	3/24/1998	0869051	12/17/2003	Manitowoc Crane Companies, LLC
Germany	Issued	MECHANICAL TRACK DRIVE	98302171.8	3/24/1998	69820508.1	12/17/2003	Manitowoc Crane Companies, LLC

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
Japan	Issued	MECHANICAL TRACK DRIVE	10-088770	4/1/1998	4073537	2/1/2008	Manitowoc Crane Companies, LLC
United States	Issued	MECHANICAL TRACK DRIVE	08/834,673	2/3/2000	6,158,535	12/12/2000	Manitowoc Crane Companies, LLC
Austria	Issued	METHOD OF CONNECTING CRANE SUSPENSION ASSEMBLY SECTIONS TOGETHER AND FRAME MOUNTED ASSEMBLY USED THEREFORE	E623306	1/10/2012	2476642	7/24/2013	Manitowoc Crane Companies, LLC
Brazil	Filed	METHOD OF CONNECTING CRANE SUSPENSION ASSEMBLY SECTIONS TOGETHER AND FRAME MOUNTED ASSEMBLY USED THEREFORE	BR102012000710-0	1/11/2012			Manitowoc Crane Companies, LLC
China P.R.	Filed	METHOD OF CONNECTING CRANE SUSPENSION ASSEMBLY SECTIONS TOGETHER AND FRAME MOUNTED ASSEMBLY USED THEREFORE	201210061759.1	1/12/2012			Manitowoc Crane Companies, LLC
European Patent Convention	Issued	METHOD OF CONNECTING CRANE SUSPENSION ASSEMBLY SECTIONS TOGETHER AND FRAME MOUNTED	12150569.7	1/10/2012	2476642	7/24/2013	Manitowoc Crane Companies, LLC

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		ASSEMBLY USED THEREFORE					
Germany	Issued	METHOD OF CONNECTING CRANE SUSPENSION ASSEMBLY SECTIONS TOGETHER AND FRAME MOUNTED ASSEMBLY USED THEREFORE	60 2012 000 129.1	1/10/2012	2476642	7/24/2013	Manitowoc Crane Companies, LLC
Japan	Filed	METHOD OF CONNECTING CRANE SUSPENSION ASSEMBLY SECTIONS TOGETHER AND FRAME MOUNTED ASSEMBLY USED THEREFORE	2012-003670	1/12/2012			Manitowoc Crane Companies, LLC
Russian Federation	Filed	METHOD OF CONNECTING CRANE SUSPENSION ASSEMBLY SECTIONS TOGETHER AND FRAME MOUNTED ASSEMBLY USED THEREFORE	2012100300	1/11/2012			Manitowoc Crane Companies, LLC
United States	Issued	METHOD OF CONNECTING CRANE SUSPENSION ASSEMBLY SECTIONS TOGETHER AND FRAME MOUNTED ASSEMBLY USED THEREFORE	13/348,467	1/11/2012	9,132,999	9/15/2015	Manitowoc Crane Companies, LLC
Brazil	Filed	MOBILE LIFT CRANE WITH	PI0711454-0	5/11/2007			Manitowoc Crane

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		LIFT ENHANCING ATTACHMENT					Companies, LLC
China P.R.	Issued	MOBILE LIFT CRANE WITH LIFT ENHANCING ATTACHMENT	20078001718 5.5	5/11/2007	20078001718 5.5	9/5/2012	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	MOBILE LIFT CRANE WITH LIFT ENHANCING ATTACHMENT	07762113.4	5/11/2007	2018341	10/28/2015	Manitowoc Crane Companies, LLC
France	Issued	MOBILE LIFT CRANE WITH LIFT ENHANCING ATTACHMENT	07762113.4	5/11/2007	2018341	10/28/2015	Manitowoc Crane Companies, LLC
Germany	Issued	MOBILE LIFT CRANE WITH LIFT ENHANCING ATTACHMENT	07762113.4	5/11/2007	2018341	10/28/2015	Manitowoc Crane Companies, LLC
Great Britain	Issued	MOBILE LIFT CRANE WITH LIFT ENHANCING ATTACHMENT	07762113.4	5/11/2007	2018341	10/28/2015	Manitowoc Crane Companies, LLC
Japan	Issued	MOBILE LIFT CRANE WITH LIFT ENHANCING ATTACHMENT	2009-511180	5/11/2007	5331682	8/2/2013	Manitowoc Crane Companies, LLC
Russian Federation	Issued	MOBILE LIFT CRANE WITH LIFT ENHANCING ATTACHMENT	2008149047	5/11/2007	2445251	3/20/2012	Manitowoc Crane Companies, LLC
United States	Issued	MOBILE LIFT CRANE WITH LIFT ENHANCING ATTACHMENT	12/268,868	5/11/2007	7,766,176	8/3/2010	Manitowoc Crane Companies, LLC
Japan	Issued	MULTIPLE POSITION WIRE ROPE GUIDE	2007-121832	4/25/1997	4215807	11/14/2008	Manitowoc Crane Companies, LLC
United States	Issued	MULTIPLE POSITION WIRE ROPE GUIDE	08/950,870	10/15/1997	5,960,970	10/5/1999	Manitowoc Crane Companies, LLC
United States	Issued	OFFSETTING LINK	08/916,738	8/19/1997	5,842,587	12/1/1998	Manitowoc Crane

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		ASSEMBLY FOR FOLDING LUFFING JIB					Companies, LLC
Brazil	Filed	OUTRIGGER PAD MONITORING SYSTEM	BR102013028003-8	10/30/2013			Manitowoc Crane Companies, LLC
China P.R.	Filed	OUTRIGGER PAD MONITORING SYSTEM	201310669724.0	10/31/2013			Manitowoc Crane Companies, LLC
European Patent Convention	Filed	OUTRIGGER PAD MONITORING SYSTEM	13189867.8	10/23/2013			Manitowoc Crane Companies, LLC
India	Filed	OUTRIGGER PAD MONITORING SYSTEM	4861/CHE/2013	10/29/2013			Manitowoc Crane Companies, LLC
Japan	Filed	OUTRIGGER PAD MONITORING SYSTEM	2013-223017	10/28/2013			Manitowoc Crane Companies, LLC
Russian Federation	Filed	OUTRIGGER PAD MONITORING SYSTEM	2013148387	10/30/2013			Manitowoc Crane Companies, LLC
United States	Filed	OUTRIGGER PAD MONITORING SYSTEM	13/828,127	3/14/2013			Manitowoc Crane Companies, LLC
Brazil	Filed	PIN PULLER FOR CRANE CONNECTIONS	BR102014003932-5	2/20/2014			Manitowoc Crane Companies, LLC
China P.R.	Filed	PIN PULLER FOR CRANE CONNECTIONS	201410059354.3	2/21/2014			Manitowoc Crane Companies, LLC
European Patent Convention	Filed	PIN PULLER FOR CRANE CONNECTIONS	14154819.8	2/12/2014			Manitowoc Crane Companies, LLC
India	Filed	PIN PULLER FOR CRANE CONNECTIONS	805/CHE/2014	2/19/2014			Manitowoc Crane Companies, LLC
Japan	Filed	PIN PULLER FOR CRANE CONNECTIONS	2014-031197	2/21/2014			Manitowoc Crane Companies, LLC
Russian Federation	Filed	PIN PULLER FOR CRANE	2013126931	6/13/2013			Manitowoc Crane

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
n		CONNECTION S					Companies, LLC
United States	Filed	PIN PULLER FOR CRANE CONNECTION S	13/841,082	3/15/2013			Manitowoc Crane Companies, LLC
United States	Issued	PINNED CONNECTION SYSTEM FOR CRANE COLUMN SEGMENTS	13/236,307	9/19/2011	8,739,988	6/3/2014	Manitowoc Crane Companies, LLC
Austria	Issued	PINNED CONNECTION SYSTEM FOR CRANE COLUMN SEGMENTS	11181910.8	9/20/2011	2431322	10/21/2015	Manitowoc Crane Companies, LLC
Belgium	Issued	PINNED CONNECTION SYSTEM FOR CRANE COLUMN SEGMENTS	11181910.8	9/20/2011	2431322	10/21/2015	Manitowoc Crane Companies, LLC
Brazil	Filed	PINNED CONNECTION SYSTEM FOR CRANE COLUMN SEGMENTS	PI1106925-2	9/20/2011			Manitowoc Crane Companies, LLC
China P.R.	Filed	PINNED CONNECTION SYSTEM FOR CRANE COLUMN SEGMENTS	201110309628.6	9/20/2011			Manitowoc Crane Companies, LLC
European Patent Convention	Issued	PINNED CONNECTION SYSTEM FOR CRANE COLUMN SEGMENTS	11181910.8	9/20/2011	2431322	10/21/2015	Manitowoc Crane Companies, LLC
France	Issued	PINNED CONNECTION SYSTEM FOR CRANE COLUMN SEGMENTS	11181910.8	9/20/2011	2431322	10/21/2015	Manitowoc Crane Companies, LLC
Germany	Issued	PINNED CONNECTION SYSTEM FOR CRANE COLUMN	11181910.8	9/20/2011	2431322	10/21/2015	Manitowoc Crane Companies, LLC

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		SEGMENTS					
Great Britain	Issued	PINNED CONNECTION SYSTEM FOR CRANE COLUMN SEGMENTS	11181910.8	9/20/2011	2431322	10/21/2015	Manitowoc Crane Companies, LLC
India	Filed	PINNED CONNECTION SYSTEM FOR CRANE COLUMN SEGMENTS	3227/CHE/2011	9/19/2011			Manitowoc Crane Companies, LLC
Japan	Filed	PINNED CONNECTION SYSTEM FOR CRANE COLUMN SEGMENTS	2011-204954	9/20/2011			Manitowoc Crane Companies, LLC
Netherlands	Issued	PINNED CONNECTION SYSTEM FOR CRANE COLUMN SEGMENTS	11181910.8	9/20/2011	2431322	10/21/2015	Manitowoc Crane Companies, LLC
Russian Federation	Filed	PINNED CONNECTION SYSTEM FOR CRANE COLUMN SEGMENTS	2011138309	9/19/2011			Manitowoc Crane Companies, LLC
Brazil	Filed	POWER AND CONTROL FOR WIRELESS ANTI-TWO BLOCK SYSTEM	PI1100956-0	3/18/2011			Manitowoc Crane Companies, LLC
China P.R.	Issued	POWER AND CONTROL FOR WIRELESS ANTI-TWO BLOCK SYSTEM	201110045166.1	2/24/2011	201110045166.1	2/4/2015	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	POWER AND CONTROL FOR WIRELESS ANTI-TWO BLOCK SYSTEM	11150493.2	1/10/2011	2377798	11/14/2012	Manitowoc Crane Companies, LLC
Germany	Issued	POWER AND CONTROL FOR WIRELESS ANTI-TWO	11150493.2	1/10/2011	602011000422.0	11/14/2012	Manitowoc Crane Companies, LLC

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		BLOCK SYSTEM					
India	Filed	POWER AND CONTROL FOR WIRELESS ANTI-TWO BLOCK SYSTEM	61/KOL/2011	1/17/2011			Manitowoc Crane Companies, LLC
Japan	Filed	POWER AND CONTROL FOR WIRELESS ANTI-TWO BLOCK SYSTEM	2011-8639	1/19/2011			Manitowoc Crane Companies, LLC
United States	Issued	POWER AND CONTROL FOR WIRELESS ANTI-TWO BLOCK SYSTEM	12/762,186	4/16/2010	8,905,250	12/9/2014	Manitowoc Crane Companies, LLC
Brazil	Filed	REMOTE DIAGNOSTIC SYSTEM	BR10201500214-9	1/6/2015			Manitowoc Crane Companies, LLC
China P.R.	Filed	REMOTE DIAGNOSTIC SYSTEM	201510008935.9	1/8/2015			Manitowoc Crane Companies, LLC
European Patent Convention	Filed	REMOTE DIAGNOSTIC SYSTEM	14198839.4	12/18/2014			Manitowoc Crane Companies, LLC
India	Filed	REMOTE DIAGNOSTIC SYSTEM	n/a	1/5/2015			Manitowoc Crane Companies, LLC
Japan	Filed	REMOTE DIAGNOSTIC SYSTEM	2015-000636	1/6/2015			Manitowoc Crane Companies, LLC
Russian Federation	Filed	REMOTE DIAGNOSTIC SYSTEM	2014151867	12/22/2014			Manitowoc Crane Companies, LLC
United States	Filed	REMOTE DIAGNOSTIC SYSTEM	14/590,608	1/6/2015			Manitowoc Crane Companies, LLC
European Patent Convention	Issued	ROTATABLE CONNECTION SYSTEM FOR CRANE BOOM SECTIONS	00301155.8	2/15/2000	1044922	6/14/2006	Manitowoc Crane Companies, LLC

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
Germany	Issued	ROTATABLE CONNECTION SYSTEM FOR CRANE BOOM SECTIONS	00301155.8	2/15/2000	P60028647.9	6/14/2006	Manitowoc Crane Companies, LLC
Japan	Issued	ROTATABLE CONNECTION SYSTEM FOR CRANE BOOM SECTIONS	2000-055734	3/1/2000	4448591	1/29/2010	Manitowoc Crane Companies, LLC
United States	Issued	ROTATABLE CONNECTION SYSTEM FOR CRANE BOOM SECTIONS	09/259,223	3/1/1999	6,213,318	4/10/2001	Manitowoc Crane Companies, LLC
United States	Filed	RUGGEDIZED PACKAGING FOR LINEAR DISTANCE MEASUREMENT SENSORS	62/118,183	2/19/2015			Manitowoc Crane Companies, LLC
European Patent Convention	Issued	SELF-ASSEMBLING BOOM HOIST CYLINDER CRANE	97302866.5	4/25/1997	0803467	8/24/2005	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	SELF-ASSEMBLING BOOM HOIST CYLINDER CRANE	05016601.6	7/29/2005	1616835	12/27/2006	Manitowoc Crane Companies, LLC
Germany	Issued	SELF-ASSEMBLING BOOM HOIST CYLINDER CRANE	97302866.5	4/25/1997	69734038.4	8/24/2005	Manitowoc Crane Companies, LLC
Germany	Issued	SELF-ASSEMBLING BOOM HOIST CYLINDER CRANE	05016601.6	4/25/1997	69737166.2	12/27/2006	Manitowoc Crane Companies, LLC
Brazil	Filed	SWING DRIVE SYSTEM FOR CRANES	PI1003261-4	2/25/2010			Manitowoc Crane Companies, LLC
China P.R.	Issued	SWING DRIVE SYSTEM FOR CRANES	20091020980.0.3	9/30/2009	20091020980.0.3	5/14/2014	Manitowoc Crane Companies, LLC
European Patent Convention	Filed	SWING DRIVE SYSTEM FOR CRANES	10250331.5	2/24/2010			Manitowoc Crane Companies, LLC

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
India	Filed	SWING DRIVE SYSTEM FOR CRANES	449/CHE/2010	2/22/2010			Manitowoc Crane Companies, LLC
Japan	Issued	SWING DRIVE SYSTEM FOR CRANES	2010-038610	2/24/2010	5676119	1/9/2015	Manitowoc Crane Companies, LLC
Russian Federation	Issued	SWING DRIVE SYSTEM FOR CRANES	2010105923	2/19/2010	2532201	9/4/2014	Manitowoc Crane Companies, LLC
United States	Issued	SWING DRIVE SYSTEM FOR CRANES	12/710,960	2/23/2010	8,573,419	11/5/2013	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	SWING LOCK MECHANISM	98302284.9	3/25/1998	0869097	5/12/2004	Manitowoc Crane Companies, LLC
Germany	Issued	SWING LOCK MECHANISM	98302284.9	3/25/1998	69823731.5	5/12/2004	Manitowoc Crane Companies, LLC
Japan	Issued	SWING LOCK MECHANISM	10-088771	4/1/1998	4291894	4/10/2009	Manitowoc Crane Companies, LLC
United States	Issued	SWING LOCK MECHANISM	08/826,627	4/3/1997	6,010,018	1/4/2000	Manitowoc Crane Companies, LLC
Brazil	Filed	SYSTEM FOR MEASURING LENGTH OF A BEAM EXTENSION AND DETECTING SUPPORT	BR112013028363-7	4/27/2012			Manitowoc Crane Companies, LLC
China P.R.	Filed	SYSTEM FOR MEASURING LENGTH OF A BEAM EXTENSION AND DETECTING SUPPORT	201280033223.7	4/27/2012			Manitowoc Crane Companies, LLC
European Patent Convention	Filed	SYSTEM FOR MEASURING LENGTH OF A BEAM EXTENSION	12779649.8	4/27/2012			Manitowoc Crane Companies, LLC

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		AND DETECTING SUPPORT					
India	Filed	SYSTEM FOR MEASURING LENGTH OF A BEAM EXTENSION AND DETECTING SUPPORT	9017/CHENP/2013	4/27/2012			Manitowoc Crane Companies, LLC
Japan	Filed	SYSTEM FOR MEASURING LENGTH OF A BEAM EXTENSION AND DETECTING SUPPORT	JP2014-509327	4/27/2012			Manitowoc Crane Companies, LLC
United States	Issued	SYSTEM FOR MEASURING LENGTH OF A BEAM EXTENSION AND DETECTING SUPPORT	13/100,758	5/4/2011	8,881,919	11/11/2014	Manitowoc Crane Companies, LLC
Austria	Issued	SYSTEM FOR SUPPLYING HEAT TO CONSTRUCTION EQUIPMENT CAB	10154758.6	2/26/2010	2236328	10/3/2012	Manitowoc Crane Companies, LLC
Brazil	Filed	SYSTEM FOR SUPPLYING HEAT TO CONSTRUCTION EQUIPMENT CAB	PI1000864-0	3/30/2010			Manitowoc Crane Companies, LLC
China P.R.	Issued	SYSTEM FOR SUPPLYING HEAT TO CONSTRUCTION EQUIPMENT CAB	20101015626 5.2	3/30/2010	20101015626 5.2	11/28/2012	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	SYSTEM FOR SUPPLYING HEAT TO CONSTRUCTION EQUIPMENT CAB	10154758.6	2/26/2010	2236328	10/3/2012	Manitowoc Crane Companies, LLC
Germany	Issued	SYSTEM FOR SUPPLYING	10154758.6	2/26/2010	60201000301 7.2	10/3/2012	Manitowoc Crane

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		HEAT TO CONSTRUCTION EQUIPMENT CAB					Companies, LLC
India	Filed	SYSTEM FOR SUPPLYING HEAT TO CONSTRUCTION EQUIPMENT CAB	152/KOL/2010	2/18/2010			Manitowoc Crane Companies, LLC
Italy	Issued	SYSTEM FOR SUPPLYING HEAT TO CONSTRUCTION EQUIPMENT CAB	10154758.6	2/26/2010	2236328	10/3/2012	Manitowoc Crane Companies, LLC
Russian Federation	Issued	SYSTEM FOR SUPPLYING HEAT TO CONSTRUCTION EQUIPMENT CAB	2010111634	3/29/2010	2449898	5/10/2012	Manitowoc Crane Companies, LLC
United States	Issued	SYSTEM FOR SUPPLYING HEAT TO CONSTRUCTION EQUIPMENT CAB	12/417,256	4/2/2009	8,905,321	12/9/2014	Manitowoc Crane Companies, LLC
Austria	Issued	TAILOR WELDED PANEL BEAM FOR CONSTRUCTION MACHINE AND METHOD OF MANUFACTURING	12176561.4	7/16/2012	2548834	3/4/2015	Manitowoc Crane Companies, LLC
China P.R.	Filed	TAILOR WELDED PANEL BEAM FOR CONSTRUCTION MACHINE AND METHOD OF MANUFACTURING	201210255031.2	7/23/2012			Manitowoc Crane Companies, LLC
European Patent Convention	Issued	TAILOR WELDED PANEL BEAM FOR CONSTRUCTION	12176561.4	7/16/2012	2548834	3/4/2015	Manitowoc Crane Companies, LLC

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		N MACHINE AND METHOD OF MANUFACTURING					
European Patent Convention	Filed	TAILOR WELDED PANEL BEAM FOR CONSTRUCTION MACHINE AND METHOD OF MANUFACTURING	15151928.7	1/21/2015			Manitowoc Crane Companies, LLC
Germany	Issued	TAILOR WELDED PANEL BEAM FOR CONSTRUCTION MACHINE AND METHOD OF MANUFACTURING	12176561.4	7/16/2012	602012005504.9	3/4/2015	Manitowoc Crane Companies, LLC
Japan	Filed	TAILOR WELDED PANEL BEAM FOR CONSTRUCTION MACHINE AND METHOD OF MANUFACTURING	2012-161078	7/20/2012			Manitowoc Crane Companies, LLC
United States	Filed	TAILOR WELDED PANEL BEAM FOR CONSTRUCTION MACHINE AND METHOD OF MANUFACTURING	13/239,006	9/21/2011			Manitowoc Crane Companies, LLC
United States	Filed	TAILOR WELDED PANEL BEAM FOR CONSTRUCTION MACHINE AND METHOD OF	15/006,864	1/26/2016			Manitowoc Crane Companies, LLC

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		MANUFACTURING					
Austria	Issued	TRACK CONNECTION SYSTEM FOR MOBILE VEHICLES, INCLUDING LIFT CRANES	09250299.6	2/5/2009	2088064	6/15/2011	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	TRACK CONNECTION SYSTEM FOR MOBILE VEHICLES, INCLUDING LIFT CRANES	09250299.6	2/5/2009	2088064	6/15/2011	Manitowoc Crane Companies, LLC
Germany	Issued	TRACK CONNECTION SYSTEM FOR MOBILE VEHICLES, INCLUDING LIFT CRANES	09250299.6	2/5/2009	602009001549.4	6/15/2011	Manitowoc Crane Companies, LLC
United States	Issued	TRACK CONNECTION SYSTEM FOR MOBILE VEHICLES, INCLUDING LIFT CRANES	12/368,125	2/9/2009	8,104,846	1/31/2012	Manitowoc Crane Companies, LLC
Austria	Issued	TRACK TENSIONING SYSTEM FOR MOBILE VEHICLES, INCLUDING LIFT CRANES	09250297.0	2/5/2009	2088065	7/13/2011	Manitowoc Crane Companies, LLC
European Patent Convention	Issued	TRACK TENSIONING SYSTEM FOR MOBILE VEHICLES, INCLUDING LIFT CRANES	09250297.0	2/5/2009	2088065	7/13/2011	Manitowoc Crane Companies, LLC
Germany	Issued	TRACK TENSIONING SYSTEM FOR MOBILE VEHICLES, INCLUDING LIFT CRANES	09250297.0	2/5/2009	602009001798.5	7/13/2011	Manitowoc Crane Companies, LLC
United States	Issued	TRACK TENSIONING	12/368,113	2/9/2009	8,414,091	4/9/2013	Manitowoc Crane

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		SYSTEM FOR MOBILE VEHICLES, INCLUDING LIFT CRANES					Companies, LLC
European Patent Convention	Issued	TRANSPORTABLE CRANE	97116641.8	9/24/1997	832841	6/2/2004	Manitowoc Crane Companies, LLC
Mexico	Issued	TRANSPORTABLE CRANE	977300	9/24/1997	229170	7/14/2005	Manitowoc Crane Companies, LLC
United States	Issued	TRANSPORTABLE CRANE	08/774,200	12/27/1996	5,704,498	1/6/1998	Manitowoc Crane Companies, LLC
Brazil	Filed	TRANSPORTABLE MACHINERY	PI0900517-0	3/5/2009			Manitowoc Crane Companies, LLC
United States	Filed	TRANSPORTABLE MACHINERY	12/073,416	3/5/2008			Manitowoc Crane Companies, LLC
Brazil	Filed	TRUNNION TRANSPORTATION SYSTEM AND CRANE USING SAME	PI0903477-3	9/22/2009			Manitowoc Crane Companies, LLC
China P.R.	Issued	TRUNNION TRANSPORTATION SYSTEM AND CRANE USING SAME	20091017426 2.9	9/22/2009	20091017426 2.9	6/25/2014	Manitowoc Crane Companies, LLC
European Patent Convention	Filed	TRUNNION TRANSPORTATION SYSTEM AND CRANE USING SAME	09252206.9	9/16/2009			Manitowoc Crane Companies, LLC
India	Filed	TRUNNION TRANSPORTATION SYSTEM AND CRANE USING SAME	2271/CHE/2009	9/18/2009			Manitowoc Crane Companies, LLC
Japan	Issued	TRUNNION TRANSPORTATION SYSTEM AND CRANE USING SAME	2009-215545	9/17/2009	5513820	4/4/2014	Manitowoc Crane Companies, LLC
Russian Federation	Issued	TRUNNION TRANSPORTATION SYSTEM	2009135280	9/22/2009	2509712	3/20/2014	Manitowoc Crane Companies,

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		AND CRANE USING SAME					LLC
United States	Issued	TRUNNION TRANSPORTATION SYSTEM AND CRANE USING SAME	12/561,058	9/16/2009	7,997,432	8/16/2011	Manitowoc Crane Companies, LLC
United States	Filed	CYLINDER RETENTION DEVICE	62/140,852	3/31/2015			Assignment to Manitowoc Crane Companies, LLC prepared but not yet signed
United States	Filed	FAST ACTING COMPRESSIBLE STOP	62/174,899	6/12/2015			Assignment to Manitowoc Crane Companies, LLC prepared but not yet signed
United States	Filed	RETENTION ASSEMBLY FOR A CONDUIT ON A CRANE	62/141,150	3/31/2015			Assignment to Manitowoc Crane Companies, LLC prepared but not yet signed
United States	Filed	SEGMENTED SHAPE-COMPLIANT WEAR PAD FOR TELESCOPING BOOM ASSEMBLY	62/199,167	7/30/2015			Assignment to Manitowoc Crane Companies, LLC prepared but not yet signed
United States	Filed	SYSTEM AND METHOD FOR CALCULATION OF CAPACITY CHARTS AT INTERMEDIATE COUNTERWEIGHT POSITIONS	62/175,023	6/12/2015			Assignment to Manitowoc Crane Companies, LLC prepared but not yet signed
United States	Filed	SYSTEM AND METHOD FOR CRANE COUNTERWEIGHT POSITIONING	62/141,013	3/31/2015			Assignment to Manitowoc Crane Companies, LLC prepared but not yet signed

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
							signed
United States	Filed	LIFT CRANE WITH IMPROVED MOVABLE COUNTERWEIGHT	14/606,891	1/27/2015			Assignment not yet recorded. Will be Manitowoc Crane Companies, LLC
Patent Cooperation Treaty	Filed	LIFT CRANE WITH IMPROVED MOVABLE COUNTERWEIGHT	PCT/US2015/013098	1/27/2015			Assignment not yet recorded. Will be Manitowoc Crane Companies, LLC
Patent Cooperation Treaty	Filed	LIFT CRANE WITH IMPROVED MOVABLE COUNTERWEIGHT	PCT/US2015/013039	1/27/2015			Assignment not yet recorded. Will be Manitowoc Crane Companies, LLC
United States	Filed	GRAVITY ACTUATED CRANE STOP	14/965,462	12/10/2015			Assignment not yet recorded, but executed. Manitowoc Crane Companies, LLC
European Patent Convention	Filed	CRANE 3D WORKSPACE SPATIAL TECHNIQUES FOR CRANE OPERATION IN PROXIMITY OF OBSTACLES	15202088.9	12/22/2015			Assignment not yet recorded, but executed. Manitowoc Crane Companies, LLC
United States	Filed	CRANE 3D WORKSPACE SPATIAL TECHNIQUES FOR CRANE OPERATION IN PROXIMITY OF	14/974,812	12/18/2015			Assignment not yet recorded, but executed. Manitowoc Crane Companies, LLC

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		OBSTACLES					
China P.R.	Filed	GRAVITY ACTUATED CRANE STOP	n/a	12/11/2015			Assignment not yet recorded, but executed. Manitowoc Crane Companies, LLC
European Patent Convention	Filed	GRAVITY ACTUATED CRANE STOP	15199032.2	12/10/2015			Assignment not yet recorded, but executed. Manitowoc Crane Companies, LLC
Japan	Filed	GRAVITY ACTUATED CRANE STOP	2015-242382	12/11/2015			Assignment not yet recorded, but executed. Manitowoc Crane Companies, LLC
United States	Docketed	CRANE FUNCTION PERFORMANCE ENHANCEMENT FOR NON-SYMMETRICAL OUTRIGGER ARRANGEMENTS					Assignment not yet recorded; Manitowoc Crane Companies, LLC
United States	Issued	JIB LOAD LIMITING DEVICE	10/370,714	2/24/2003	6,843,383	1/18/2005	Grove U.S. L.L.C.
United States	Issued	LUFFING ANGLE MEASUREMENT SYSTEM	09/205,295	12/4/1998	6,473,715	10/29/2002	Grove U.S. L.L.C.
China P.R.	Issued	LUFFING ANGLE MEASUREMENT SYSTEM	98126161.2	12/4/1998	ZL 98126161.2	3/31/2004	Grove U.S. L.L.C.
European Patent Convention	Issued	LUFFING ANGLE MEASUREMENT SYSTEM	98123017.0	12/4/1998	0921093	10/6/2004	Grove U.S. L.L.C.

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
Germany	Issued	LUFFING ANGLE MEASUREMENT SYSTEM	98123017.0	12/4/1998	69826817.2	10/6/2004	Grove U.S. L.L.C.
Italy	Issued	LUFFING ANGLE MEASUREMENT SYSTEM	98123017.0	12/4/1998	0921093	10/6/2004	Grove U.S. L.L.C.
Japan	Issued	LUFFING ANGLE MEASUREMENT SYSTEM	377289/1998	12/7/1998	3318277	6/14/2002	Grove U.S. L.L.C.
European Patent Convention	Issued	METHOD AND APPARATUS FOR MEASURING THE LENGTH OF A MULTI-SECTION TELESCOPIC BOOM	99109289.1	5/27/1999	0 961 133	8/3/2005	Grove U.S. L.L.C.
United States	Issued	METHOD AND APPARATUS FOR MEASURING THE LENGTH OF A MULTI-SECTION TELESCOPIC BOOM	09/084,419	5/27/1998	5,877,693	3/2/1999	Grove U.S. L.L.C.
United States	Issued	METHOD FOR A LIFTING APPARATUS WITH FLOATING LIFT CYLINDER ATTACHMENT	09/661,293	9/13/2000	6,390,233	5/21/2002	Grove U.S. L.L.C.
Canada	Issued	OBSTACLE AVOIDANCE AND CRUSHING PROTECTION SYSTEM FOR OUTRIGGERS OF A CHASSIS	2,255,093	12/3/1998	2,255,093	5/17/2005	Grove U.S. L.L.C.
China P.R.	Issued	OBSTACLE AVOIDANCE AND CRUSHING PROTECTION SYSTEM FOR OUTRIGGERS	98126160.4	12/4/1998	ZL 98126160.4	6/23/2004	Grove U.S. L.L.C.

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		OF A CHASSIS					
European Patent Convention	Issued	OBSTACLE AVOIDANCE AND CRUSHING PROTECTION SYSTEM FOR OUTRIGGERS OF A CHASSIS	98123014.7	12/4/1998	0 921 092	5/19/2004	Grove U.S. L.L.C.
Germany	Issued	OBSTACLE AVOIDANCE AND CRUSHING PROTECTION SYSTEM FOR OUTRIGGERS OF A CHASSIS	98123014.7	12/4/1998	69823965.2	5/19/2004	Grove U.S. L.L.C.
Italy	Issued	OBSTACLE AVOIDANCE AND CRUSHING PROTECTION SYSTEM FOR OUTRIGGERS OF A CHASSIS	98123014.7	12/4/1998	0921092	5/19/2004	Grove U.S. L.L.C.
United States	Issued	OBSTACLE AVOIDANCE AND CRUSHING PROTECTION SYSTEM FOR OUTRIGGERS OF A CHASSIS	09/205,291	12/4/1998	6,067,024	5/23/2000	Grove U.S. L.L.C.
United States	Issued	PROTECTIVE COATING ON STEEL PARTS	08/919,448	8/28/1997	6,726,960 B1	4/27/2004	Grove U.S. L.L.C.
Australia	Issued	RE-CONFIGURABLE CRANE CARRIER	72145/01	9/17/2001	782236	10/27/2005	Grove U.S. L.L.C.
Canada	Issued	RE-CONFIGURABLE CRANE CARRIER	2,357,445	9/18/2001	2,357,445	12/4/2007	Grove U.S. L.L.C.
China P.R.	Issued	RE-CONFIGURABLE CRANE CARRIER	01140674.7	9/20/2001	ZL01140674.7	10/5/2005	Grove U.S. L.L.C.
European Patent Convention	Issued	RE-CONFIGURABLE CRANE CARRIER	01121709.8	9/17/2001	1190979	8/18/2004	Grove U.S. L.L.C.

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
Germany	Issued	RE-CONFIGURABLE CRANE CARRIER	01121709.8	9/17/2001	60104955.1	8/18/2004	Grove U.S. L.L.C.
Great Britain	Issued	RE-CONFIGURABLE CRANE CARRIER	01121709.8	9/17/2001	1190979	8/18/2004	Grove U.S. L.L.C.
Italy	Issued	RE-CONFIGURABLE CRANE CARRIER	01121709.8	9/17/2001	1190979	8/18/2004	Grove U.S. L.L.C.
Japan	Issued	RE-CONFIGURABLE CRANE CARRIER	2007-101387	4/9/2007	5155587	12/14/2012	Grove U.S. L.L.C.
Netherlands	Issued	RE-CONFIGURABLE CRANE CARRIER	01121709.8	9/17/2001	1190979	8/18/2004	Grove U.S. L.L.C.
Russian Federation	Issued	RE-CONFIGURABLE CRANE CARRIER	2001125703	9/20/2001	2271987	3/20/2006	Grove U.S. L.L.C.
Spain	Issued	RE-CONFIGURABLE CRANE CARRIER	01121709.8	9/17/2001	1190979	8/18/2004	Grove U.S. L.L.C.
United States	Issued	RE-CONFIGURABLE CRANE CARRIER	09/666,599	9/20/2000	6,631,817	10/14/2003	Grove U.S. L.L.C.
China P.R.	Issued	TELESCOPING SYSTEM WITH MULTIPLE SINGLE-STAGE TELESCOPIC CYLINDERS	99107465.3	4/6/1999	ZL 99107465.3	10/6/2004	Grove U.S. L.L.C.
European Patent Convention	Issued	TELESCOPING SYSTEM WITH MULTIPLE SINGLE-STAGE TELESCOPIC CYLINDERS	99106136.7	4/6/1999	947710	9/15/2004	Grove U.S. L.L.C.
Germany	Issued	TELESCOPING SYSTEM WITH MULTIPLE SINGLE-STAGE TELESCOPIC CYLINDERS	99106136.7	4/6/1999	947710	9/15/2004	Grove U.S. L.L.C.

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
India	Issued	TELESCOPING SYSTEM WITH MULTIPLE SINGLE-STAGE TELESCOPIC CYLINDERS	515/DEL/99	4/6/1999	197395	8/18/2006	Grove U.S. L.L.C.
Italy	Issued	TELESCOPING SYSTEM WITH MULTIPLE SINGLE-STAGE TELESCOPIC CYLINDERS	99106136.7	4/6/1999	0947710	9/15/2004	Grove U.S. L.L.C.
Japan	Issued	TELESCOPING SYSTEM WITH MULTIPLE SINGLE-STAGE TELESCOPIC CYLINDERS	98751/1999	4/6/1999	3515414	1/23/2004	Grove U.S. L.L.C.
Mexico	Issued	TELESCOPING SYSTEM WITH MULTIPLE SINGLE-STAGE TELESCOPIC CYLINDERS	9903184	4/6/1999	228665	6/23/2005	Grove U.S. L.L.C.
United States	Issued	TELESCOPING SYSTEM WITH MULTIPLE SINGLE-STAGE TELESCOPIC CYLINDERS	09/055,299	4/6/1998	6,029,559	2/29/2000	Grove U.S. L.L.C.
China P.R.	Issued	TELESCOPING SYSTEM WITH MULTI-STAGE TELESCOPIC CYLINDER	99107464.5	4/6/1999	99107464.5	4/20/2005	Grove U.S. L.L.C.
European Patent Convention	Issued	TELESCOPING SYSTEM WITH MULTI-STAGE TELESCOPIC CYLINDER	99106135.9	4/6/1999	947709	10/12/2005	Grove U.S. L.L.C.
Germany	Issued	TELESCOPING SYSTEM WITH MULTI-STAGE TELESCOPIC CYLINDER	99106135.9	4/6/1999	69927632.2	10/12/2005	Grove U.S. L.L.C.
India	Issued	TELESCOPING SYSTEM WITH MULTI-STAGE	516/DEL/1999	4/6/1999	216367	3/12/2008	Grove U.S. L.L.C.

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		TELESCOPIC CYLINDER					
Italy	Issued	TELESCOPING SYSTEM WITH MULTI-STAGE TELESCOPIC CYLINDER	99106135.9	4/6/1999	0947709	10/12/2005	Grove U.S. L.L.C.
Japan	Issued	TELESCOPING SYSTEM WITH MULTI-STAGE TELESCOPIC CYLINDER	98746/1999	4/6/1999	3592952	9/3/2004	Grove U.S. L.L.C.
Mexico	Issued	TELESCOPING SYSTEM WITH MULTI-STAGE TELESCOPIC CYLINDER	9903183	4/6/1999	229590	7/29/2005	Grove U.S. L.L.C.
South Korea	Issued	TELESCOPING SYSTEM WITH MULTI-STAGE TELESCOPIC CYLINDER	10-1999-0011913	4/6/1999	597531	6/29/2006	Grove U.S. L.L.C.
United States	Issued	TELESCOPING SYSTEM WITH MULTI-STAGE TELESCOPIC CYLINDER	09/055,239	4/6/1998	6,116,140	9/12/2000	Grove U.S. L.L.C.
Brazil	Issued	THERMAL CONTRACTION CONTROL APPARATUS FOR HYDRAULIC CYLINDERS	PI0300470-8	2/25/2003	PI0300470-8	5/31/2011	Grove U.S. L.L.C.
Canada	Issued	THERMAL CONTRACTION CONTROL APPARATUS FOR HYDRAULIC CYLINDERS	2,419,734	2/25/2003	2,419,734	8/4/2009	Grove U.S. L.L.C.
Germany	Issued	THERMAL CONTRACTION CONTROL APPARATUS FOR HYDRAULIC CYLINDERS	10307993.9	2/25/2003	10307993.9	3/8/2007	Grove U.S. L.L.C.
Mexico	Issued	THERMAL CONTRACTION CONTROL APPARATUS FOR	PA/a/2003/001700	2/25/2003	238024	6/23/2006	Grove U.S. L.L.C.

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		HYDRAULIC CYLINDERS					
United States	Issued	THERMAL CONTRACTION CONTROL APPARATUS FOR HYDRAULIC CYLINDERS	10/082,217	2/26/2002	6,634,172	10/21/2003	Grove U.S. L.L.C.
United States	Issued	WORK TRANSFER LOCK SYSTEM AND METHOD THEREOF	09/212,597	12/16/1998	6,161,638	12/19/2000	Grove U.S. L.L.C.
China P.R.	Issued	WORK TRANSFER LOCK SYSTEM AND METHOD THEREOF	99126759.1	12/16/1999	ZL 99126759.1	11/19/2003	Grove U.S. L.L.C.
European Patent Convention	Issued	WORK TRANSFER LOCK SYSTEM AND METHOD THEREOF	99123250.5	11/29/1999	1010663	7/6/2005	Grove U.S. L.L.C.
Germany	Issued	WORK TRANSFER LOCK SYSTEM AND METHOD THEREOF	99123250.5	11/29/1999	69926047.7	7/6/2005	Grove U.S. L.L.C.
Italy	Issued	WORK TRANSFER LOCK SYSTEM AND METHOD THEREOF	99123250.5	11/29/1999	1010663	7/6/2005	Grove U.S. L.L.C.
Mexico	Issued	WORK TRANSFER LOCK SYSTEM AND METHOD THEREOF	9911681	12/14/1999	219812	4/7/2004	Grove U.S. L.L.C.
China P.R.	Issued	ANTI-TWO BLOCK DEVICE USING NON-CONTACT MEASURING AND DETECTING DEVICES	98126453	12/4/1998	ZL 98126453.0	12/29/2004	Grove US LLC
European Patent Convention	Issued	ANTI-TWO BLOCK DEVICE USING NON-CONTACT	98123012.1	12/4/1998	921089	10/8/2003	Grove US LLC

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		MEASURING AND DETECTING DEVICES					
Germany	Issued	ANTI-TWO BLOCK DEVICE USING NON-CONTACT MEASURING AND DETECTING DEVICES	98123012.1	12/4/1998	69818781.4	10/8/2003	Grove US LLC
Italy	Issued	ANTI-TWO BLOCK DEVICE USING NON-CONTACT MEASURING AND DETECTING DEVICES	98123012.1	12/4/1998	921089	10/8/2003	Grove US LLC
United States	Issued	ANTI-TWO BLOCK DEVICE USING NON-CONTACT MEASURING AND DETECTING DEVICES	09/205,298	12/4/1998	6,343,703	2/5/2002	Grove US LLC
European Patent Convention	Issued	AUTOMATIC LEVELING AND SYNCHRONIZATION SYSTEM FOR COUNTERWEIGHT REMOVAL AND INSTALLATION	98120604.8	10/30/1998	931756	9/28/2005	Grove US LLC
Germany	Issued	AUTOMATIC LEVELING AND SYNCHRONIZATION SYSTEM FOR COUNTERWEIGHT REMOVAL AND	98120604.8	10/30/1998	69831724.6	9/28/2005	Grove US LLC

Country Name	Status	Title	Application Number	Application Date	Patent Number	Issue Date	Assignee
		INSTALLATION					
United States	Issued	AUTOMATIC LEVELING AND SYNCHRONIZATION SYSTEM FOR COUNTERWEIGHT REMOVAL AND INSTALLATION	09/182,464	10/30/1998	6,050,430	4/18/2000	Grove US LLC

COUNTRY	PATENT	PATENT NUMBER	REGIS. DATE	OWNER INFORMATION
USA	CARBODY TO CRAWLER CONNECTION	5823279	10/20/98	Manitowoc Crane Companies, LLC
USA	ASSEMBLY TO SUPPORT A CONDUIT ON A CRANE	14207052	3/12/14	Manitowoc Crane Companies, LLC
USA	RING SEGMENT CONNECTION	5522515	6/4/96	Manitowoc Crane Companies, LLC
USA	LIFTCRANE WITH SYNCHRONOUS ROPE OPERATION	5579931	12/3/96	Manitowoc Crane Companies, LLC
USA	A CRANE COUNTERWEIGHT INSTALLATION AND REMOVAL APPARATUS	5615784	4/1/97	Manitowoc Crane Companies, LLC
USA	EASILY REMOVABLE SHEAVE ASSEMBLY	5649635	7/22/97	Manitowoc Crane Companies, LLC
USA	SYSTEM FOR OVERVOLTAGE SUPPRESSION FOR CONSTRUCTION EQUIPMENT	7508643	3/24/09	Manitowoc Crane Companies, LLC